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REPORT.

PART I.

INTRODUCTION AND GENERAL STATEMENTS.

This is the Thirty-first Annual Report of the Secretary of the State Board of Health, and is for the fiscal year ending June 30, 1903. It is arranged in two parts.

The first part contains the secretary's report of work of the Board during the fiscal year; regular and special meetings; public health legislation and proposed legislation; obituary notice of Robert Clark Kedzie, A. M., M. D., Sc. D.; president's annual address; general work in the office of the secretary; report of the secretary relative to property; financial statement; abstracts from the quarterly reports of work in the office of the secretary, and of the condition of health during the six months ending June 30, 1903. (The subject of the sickness in the calendar year preceding, is included in the article in the second part of this annual report, therefore the brief article in this first part, relating to the first six months of 1903, brings the subject completely up to date.)

The second part contains abstracts and reports, including a report on "Principal meteorological conditions in Michigan in 1902," one on "Time of greatest prevalence of each disease," being a "Study of the causes of sickness in Michigan," especially in 1902, one on "Communicable diseases in Michigan in 1902," and others on consumption, pneumonia, meningitis, typhoid fever, diphtheria, whooping-cough, measles, scarlet fever, rötheln, smallpox, and other communicable diseases, including chicken-pox, erysipelas, puerperal fever, tetanus, mumps (parotitis), barber's itch, rabies (hydrophobia), tuberculosis in cattle, glanders (farcy), anthrax, actinomycosis (lump jaw), hog cholera, injuries and loss of life and property alleged to have been caused by the use of kerosene and gasoline and alleged nuisances, in Michigan in 1902.

Reports, etc., required by law.—Much of the work of the State Board of Health, and of its secretary and executive officer, is in the collection, preparation, and spreading of information useful for the restriction and prevention of diseases, and the methods of work are dealt with further on in this report; but, under the law the secretary of the Board is specifically required to disseminate information "through an annual report, and otherwise;" pursuant to which, by direction of the Board, he issues immediately after the close of each week, a bulletin, which shows the diseases which caused most sickness during the week just passed; also a monthly bulletin, showing the relative importance of diseases during the month.

Since April, 1898, a monthly publication, entitled "Teachers' Sanitary Bulletin," has been issued by the Board to supply to more than twenty thousand teachers in the public schools in Michigan suggestions to enable them better and more completely to comply with the law which requires "That there shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases is spread and the best methods for the restriction and prevention of each such disease."

Sanitary information published ephemerally.—The secretary also disseminates information by means of the telegraph, the telephone, by letter, and especially by means of hektographed and neostyled statements prepared and distributed to members of the Board, to others interested in public health work, and to newspapers in Michigan. Thus items of sanitary interest which are considered as useful "news" are published at once in comparatively ephemeral bulletins, etc., while the annual report is issued as a permanent official record of the work of the State Board of Health, of the office of the secretary, and of local boards of health throughout the State.

Names and addresses of members of the Board.—The names and post-office addresses of members of the State Board of Health, and the dates of the expiration of their terms of office, are as follows:

Hon. Frank Wells, *President of the Board*, Lansing, January 31, 1909.
Charles M. Ranger, A. B., Battle Creek, January 31, 1909.
Hon. Henry A. Haigh, Detroit, January 31, 1907.
Victor C. Vaughan, M. D., Ann Arbor, January 31, 1907.
Collins H. Johnston, M. D., Grand Rapids, January 31, 1905.
D. A. MacLachlan, M. D., Detroit, January 31, 1905.
Henry B. Baker, M. D., *Secretary of the Board*, Lansing.

The members of the State Board of Health, with the exception of the secretary, are appointed for the term of six years, and receive no salary or per diem compensation for their services.

Standing committees of the State Board of Health.—Notwithstanding the assignment to committees of the duty of investigation in certain lines of work, each member is free to present any facts or views on any subject relative to or having any bearing upon the public health.

The committees as rearranged and adopted by the Board April 12, 1901, and the members appointed on committees by President Frank Wells, April 12, 1901, are as follows:

1. Epidemic, endemic and communicable diseases, Victor C. Vaughan, M. D.
2. Sewerage and the disposal of excreta.
3. Water supply, including purification of sewage-contaminated water, Collins H. Johnston, M. D.
4. Buildings, including house drainage, ventilation, heating, etc., D. A. MacLachlan, M. D.
5. Climate, geology, topography and drainage, Henry B. Baker, M. D.
6. Foods, drinks and their adulteration, Victor C. Vaughan, M. D.
7. Poisons, explosives, etc.
8. School hygiene and sanitation, D. A. MacLachlan, M. D.
9. Sanitary inspection in cities and villages, Henry B. Baker, M. D.
10. Statistics of mortality and sickness, Hon. Frank Wells.

11. Public health legislation, Hon. Henry A. Haigh.
12. Finances of the Board, Hon. Frank Wells.
13. Animals' diseases dangerous to man, Collins H. Johnston, M. D.
14. Relations of preventable sickness to taxation, Henry B. Baker, M. D.
15. Quarantine at the Michigan border and within the State, Hon. Henry A. Haigh.

WORK OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1903.

Aside from the work in committees and in connection with the office of the Secretary of the Board, the work of the State Board of Health itself has included that done at the sanitary conventions, that in connection with the examination of plans and specifications for proposed public buildings, the examination of persons to determine their qualifications for licenses to properly embalm and disinfect bodies dead of infectious and contagious diseases, and the work done at regular and special meetings of the Board.

Sanitary conventions.—During the year ending June 30, 1903, there was held one important sanitary convention similar to those held in previous years, and one Health Officials' Conference participated in by the health officials, physicians, and persons interested in public health subjects, throughout this State, and by a few from without the State. This last-mentioned will be noticed in the paragraph following this one. The convention occurred at Cheboygan, July 23 and 24, 1902. At such conventions, held from time to time under the direction of the State Board of Health, the subject of greatest moment to the particular locality is usually the central theme, and the heaviest stress is laid upon it in the papers and discussions, although the general educational work of the board, the modern principles of public sanitation, and the best ideas in public health work are brought out. Such conventions are usually attended by those persons in the locality or neighborhood most largely interested in good sanitary conditions, improved public health and the sanitary welfare of the locality. They are sometimes attended by neighboring health officers and others directly interested in public health work.

Conference of Health Officials.—The Sixth General Conference of Health Officials in Michigan was held in Ann Arbor, January 15 and 16, 1903. The subjects to which particular attention was given were: "The Relation of the State Laboratory of Hygiene to the Health Work of the State," "Pneumonia—The New Captain of the Men of Death," "Mosquitoes and Malaria, with Some Observations in Michigan," "The Local Slaughterhouse and Meat Inspection," "Hydrophobia—Rabies, its Restriction and Prevention," "Mortality from Cancer in Michigan," "The Function of the Health Officer," "Should Vaccination be Compulsory in Michigan?" "Tuberculosis, Human and Bovine, Sanatoria for Consumptives. General Discussion of the Subject of Tuberculosis and its Restriction," "Sewerage into the Watercourses of Michigan. What should be Done About it?" and "The Plague in California, and What to do if That Disease Should be Brought into Michigan."

The discussions were valuable and interesting to any person who places an adequate estimate upon the value of human life, and especially to those in whose care public health interests are entrusted, i. e., the health officers. Papers were read and discussed by persons best fitted to offer suggestions upon the various topics assigned to them. Bacteriologists, practical sanitarians, statisticians, active medical practitioners and business men all combined to make this conference one of importance and value.

The conference was attended by many of the most efficient and conscientious local health officers and municipal bacteriologists, by the members of the State Board of Health, and by such of the general public as chose to attend. The proceedings of this conference were published as Reprint No. 589.

Examination of plans for State buildings,—sewerage, ventilation and heating, during the fiscal year ending June 30, 1903.—The following is a list of the buildings for which plans and specifications were examined, under Act No. 206, Laws of 1881 (Sec. 2229, Compiled Laws of 1897; Sec. 15, Public Health Laws 1899), during the fiscal year 1903:

Cheboygan, July 23 and 24, 1902.—Proposed new bath house for the Michigan Agricultural College. With certain exceptions, the plans were approved.

Lansing, July 11, 1902, and Ann Arbor, July 14, 1902.—Proposed new Psychopathic Ward for the University of Michigan. As the plans submitted at the two meetings were, according to the statement of the architect, not the completed plans, the call for a special meeting of the Board at Cheboygan, July 23, and 24, 1902, included a call for the examination of the completed plans, which, however, were not then, nor since then, submitted to the Board.

Examination and licensing of embalmers.—An important measure was that advocated by and enacted largely through the efforts of the Michigan Funeral Directors and Embalmers' Association, and which became—

ACT NO. 132, LAWS OF 1903.

An act empowering the State Board of Health to determine the qualifications necessary, examine and license persons qualified to practice the art of embalming and regulate the practice of embalming dead human bodies, and to repeal act number two hundred thirty-three of the public acts of nineteen hundred one.

The People of the State of Michigan enact:

Section 1. The State Board of Health is hereby authorized and empowered to determine the qualifications necessary to enable any person to properly embalm dead human bodies and disinfect the premises. The said board, or some member thereof, shall examine all applicants for an embalmer's license, and shall issue an embalmer's license to all persons who successfully pass such examination. No person shall embalm any dead human body, unless he shall hold a valid unrevoked and unexpired license from the Michigan State Board of Health authorizing him to practice the art of embalming.

Section 2. Embalmer's examinations shall be held in the city of Lansing, at least one each year, and at such other times and places as the said board may designate: Provided, That an examination shall be held once each calendar year in the Upper Peninsula, if five or more residents of the Upper Peninsula shall have on file with the secretary of the said board their applications for licenses.

The said board is hereby authorized to send but one of its members to the Upper Peninsula to conduct embalmers' examinations there.

Section 3. No person shall be granted a license under this act, who has not practiced embalming dead human bodies for at least six months, or shall have had at least six months' practical instruction in embalming and disinfecting under a licensed embalmer.

Each application for an embalmer's license shall be made in writing on blanks prescribed by the State Board of Health, and filed with the secretary of said board, and shall be accompanied by a fee of five dollars, and proof that the applicant is a person of good moral character and of the age of twenty-one years or upwards: Provided, That any person now holding an embalmer's license issued by the State Board of Health, may procure a license under this act by making application therefor within ninety days after this act shall take effect, and shall not be required to take another examination. Such application shall be made upon blanks prescribed by the said board, filed with the secretary of said board and accompanied by a fee of fifty cents: Provided further, That all licenses issued by the State Board of Health by virtue of any statute in this state, shall expire at the end of ninety days after this act shall take effect: Provided further, That any person holding an embalmer's disploma issued by the University of Michigan, shall not be required to take an examination under the terms of this act, but shall be entitled to a license upon making application therefor in manner and form prescribed by the said board, and filing the same with the secretary of the board, accompanied by a license fee of five dollars and proof that he is a person of good moral character, and at least twenty-one years of age.

Section 4. The licenses shall be signed by the president and secretary of the State Board of Health and the seal of the board affixed thereto. No license shall be issued or renewed for a period exceeding one year, and all licenses and renewals thereof shall expire and terminate the thirty-first day of July following the date of their issue, unless sooner revoked and cancelled.

Section 5. Any person holding an embalmer's license under this act may have the same renewed for not to exceed one year, and not longer than to July thirty-first, following the date of such renewal, by making and filing with the secretary of the said board an application therefor within thirty days preceding the expiration of his license, upon blanks prescribed by the said board and upon payment of fifty cents renewal fees: Provided, however, That any person neglecting or failing to have his license renewed as above may have the same renewed by making application therefor during the month of August following, and upon payment of two dollars and fifty cents revival and renewal fees.

Section 6. The Secretary of the State Board of Health shall keep a record, in which shall be registered the name and business address of every person to whom an embalmer's license has been granted in accordance with this act, and the number and date of such license, and the date of each renewal thereof. In the month of September, of each and every year, the secretary of said board shall supply each licensed emblamer, and the various transportation companies within this state, with a list of all embalmers holding a license under this act, then in force, giving the names of such persons, their business address and the numbers of their licenses. The secretary of said board shall mail notices to all undertakers in this state known to him, at least fifteen days before any embalmer's examination is to be held in the Lower Peninsula, advising them of the time and place where such examination is to be conducted, and shall mail notices to all undertakers in the Upper Peninsula known to him, at least fifteen days before any embalmer's examination is to be held in the Upper Peninsula, advising them of the time and place where such examination is to be conducted. It shall be the duty of the secretary of the State Board of Health to prepare under the direction of the said board, and cause to be printed, all blanks required by this act to be prescribed by the State Board of Health. The secretary of said board shall, between the first and fifth day of July, of each and every year, mail a printed notice to each holder of a license under this act, advising him that his license will expire the thirty-first day of that month, and enclose him therewith a blank application for renewal thereof. The secretary of said board shall also, between the first and fifth days of August, of each and every year, mail a notice to each holder of a license under this act that has not been renewed during the preceding month, advising him of the expiration of his license, and of the penalty for embalming dead human bodies without holding a license under this act, and the conditions and terms upon which his license may be revived and renewed during the month of August. All notices required to be mailed by any provision of this act, shall be directed to the last known postoffice address of the party to whom the notice is sent.

Section 7. The secretary of the State Board of Health shall keep a record of all fees received and expenses paid under this act and make a report thereof annually to the Governor. The fees collected by the State Board of Health under this act shall be used to defray the expenses incurred by said board in following the provisions of this act and enforcing the same, and for no other purpose. Any surplus on hand at the end of each fiscal year shall be covered into the treasury of the state for the benefit of the general fund of the state.

Section 8. The State Board of Health may, upon sufficient proof of the violation of any of the provisions of this act, or of the violation of any rule or regulation prescribed by the said board for the preparation, embalming, shipping or burial of any dead human body, revoke and cancel the license held by any person so violating such provision, rule or regulation.

Section 9. Any person who shall violate any of the provisions of this act shall be deemed to be guilty of a misdemeanor.

Section 10. Act number two hundred thirty-three of the public acts of nineteen hundred one, and all other acts or parts of acts, in any wise contravening the provisions of this act, are hereby repealed.

Under this act, three examinations were held during the fiscal year 1903, as follows: Lansing, April 11, 1902; Battle Creek, September 12, 1902; and Lansing, June 10, 1903. Of the 174 persons examined, 144 were granted licenses and were awarded engrossed diplomas.

During the fiscal year, 1903, there were received 1,555 duplicate transit permit blanks, Form 2, for the transportation by railroad of bodies dead of diseases not communicable, and 279 duplicates of Form 1, for bodies dead of communicable diseases. Each of these permits was examined, and whenever it was found that the rules of the State Board of Health, or the instructions set forth in the transit permit blank were not complied with, letters were sent, suggesting corrections of methods in the future. Whenever a permit was granted by a local board of health, or health officer, and the certified cause of death was given as "not communicable," when in fact it was communicable, a hektographed form, properly filled out, was sent, suggesting that a mistake had been made; if the grantor of the permit did not believe the disease to be communicable it was also suggested that he might use the words, "declared by the State Board of Health to be."

The following papers were printed in connection with the licensing of embalmers by the State Board of Health, during the fiscal year, 1903: 6,000 copies of the pamphlet, "Embalming, and the Burial, Removal and Transportation of Infected Persons and Corpses;" 30,000 copies of "Form No. 1," transit permit blanks; 65,000 copies of "Form No. 2," transit permit blanks; 14,000 copies of "Form No. 3," transit permit blanks; 3,600 copies of application blanks for license under Act 132, 1903; 1,300 copies of examination notice "To Funeral Directors;" 1,000 copies, "List of Embalmers;" 2,800 copies "Notice to Undertakers;" 500 examination number slips; 200 copies examination questions.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER SECTION 6 OF ACT 233, LAWS OF 1901), EMBALMERS' FUND, AS ALLOWED DURING THE FISCAL YEAR, 1903.

Receipts.		Disbursements.	
Fees from applicants for license	$555 00	Expenses of members—	
		Attending meetings	$73 74
		Postage—	
		Office	34 59
		Printing and binding	145 78
		Telegrams	50
		Engraving, drawing, etc	14 22
		Compensation of clerks	109 00
		Fee returned to applicant	5 00
		Miscellaneous	10 90
		Unexpended balance, turned over to the State Treasurer	161 27
Total receipts	$555 00	Total disbursements	$555 00

REGULAR AND SPECIAL MEETINGS OF THE STATE BOARD OF HEALTH, DURING THE FISCAL YEAR ENDING JUNE 30, 1903.

The minutes of the regular and special meetings of the Board up to and including the meeting October 23, 1888, were copied into the permanent record books in the office of the secretary. From that time and including the proceedings of the meeting May 13, 1898, the minutes have been printed in the annual reports of the Board. The annual report for 1898 is the last one in which the proceedings of the meetings of the Board are printed in full. Commencing with the annual report for 1899 the law of 1899 took effect, and the volume was greatly reduced in size, being limited to 300 pages. Accordingly mention only may be made of the times and places of meetings and members present at each of the regular and special meetings during the fiscal year.

Regular meeting, July 11, 1902.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Hon. Henry A. Haigh, and Dr. Henry B. Baker, Secretary.

Special meeting, July 14, 1902, Ann Arbor.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, and Dr. Henry B. Baker, Secretary.

Special meeting, July 24, 1902, Cheboygan.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Dr. D. A. MacLachlan, and Dr. Henry B. Baker, Secretary.

Special meeting, September 12, 1902, Battle Creek.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Hon. Henry A. Haigh, and Dr. Henry B. Baker, Secretary.

Regular meeting October 10, 1902.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Hon. Henry A. Haigh, and Dr. Henry B. Baker, Secretary.

Special meeting, November 10, 1902.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Hon. Henry A. Haigh, and Dr. Henry B. Baker, Secretary.

Regular meeting, January 9, 1903.—The members present were: Hon Frank Wells, President; Hon. Henry A. Haigh, Dr. Fred R. Belknap, and Dr. Henry B. Baker, Secretary.

Special meeting, January 15 and 16, 1903, Ann Arbor.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Dr. Collins H. Johnston, and Dr. Henry B. Baker, Secretary.

Regular meeting, April 10, 1903.—The members present were: Hon. Frank

Wells, President; Charles M. Ranger, Dr. Collins H. Johnston, and Dr. Henry B. Baker, Secretary.

Special meeting, June 10, 1903.—The members present were: Hon. Frank Wells, President; Dr. Victor C. Vaughan, Hon. Henry A. Haigh, Charles M. Ranger, and Dr. Henry B. Baker, Secretary.

ANNUAL ADDRESS OF THE PRESIDENT OF THE STATE BOARD OF HEALTH.*

BY HON. FRANK WELLS, PRESIDENT.

It seems to me important that at this meeting of the Board we consider such subjects of legislation as we may judge to be desirable that the legislature be asked to act upon at its present session. I therefore take this occasion to remind you of several of these subjects which have received more or less attention from us, and for several of which we have endeavored to secure action at previous sessions of the legislature.

Prominent among these is that of a State Sanatorium for Consumptives. A bill providing for this object has been before three sessions of the legislature, and its passage earnestly urged by us and by sanitarians generally. The influence of sanatoria in restricting the spread of this disease is no longer theoretical. Their beneficial influence has now been demonstrated not alone in Europe but in our own country. Several States already have them in successful operation, and others are taking steps to secure them. Consumption is no longer regarded as incurable if those suffering from it can be placed where conditions are most favorable for their recovery. Such conditions can be made to exist only in specially arranged sanatoria, where air, sunlight, suitable food and exercise with medical attendance and proper instructions for the daily life, may be had. Valuable as such sanatoria are for curing those ill with consumption, the greatest benefit derived from them is by the asylum they offer to the consumptive poor. A large proportion of these live for months and even years in crowded tenement houses, in our cities and towns, where it is nearly impossible to prevent them from spreading the disease among other inmates, thereby making of such homes centers of infection. In view of the importance to communities thus menaced of having a place where the victims of this disease who are obliged to live under conditions where there is no hope of their recovery may go, where they will not imperil the lives of others, and at the same time be comfortable and have the best possible treatment, I recommend the most vigorous efforts to secure an appropriation for this purpose.

I also recommend that effort be made to secure the passage of an act giving authority to this Board, or some other competent body, to declare what specific diseases shall be regarded as dangerous to the public health. It should not be required when suit is brought to enforce any one of the statutes in which the term "diseases dangerous to public health" is used that a jury entirely without medical knowledge should be expected to decide whether or not the particular disease belongs to this class. The passage of an act which will furnish to health authorities a definite list of diseases which our present knowledge proves to be communicable is clearly in the interests of the public health. Information to this board concerning some of these diseases not generally reported now would be of great value to the people in the restriction of such diseases by the methods which have proved so effectual in the past. As the law confers upon local boards of health full authority in the treatment of those suffering from this class of diseases, no injustice would be likely to result to them, while they would have the advantage of being furnished by this board with such literature as would prove most useful to them.

---

*January 9, 1903.

A bill providing for meetings of citizens of townships and villages each spring to vote money for public health work in the same manner that money is voted for school purposes by similar meetings has been before the legislature during one or more of its sessions. The object of the bill is a good one, and I commend it to your consideration.

A committee of this Board has been, I believe, instructed to prepare bills requiring municipalities to present plans for public water supplies and the disposal of sewage, to the Board for its action before steps are taken to carry such plans into effect. Few things are of more importance to a community than a public water supply, abundant and free from danger of contamination. It is doubtful if any of the inland lakes or streams of this State can now furnish such a supply. They are all more or less contaminated by sewage and this contamination increases every year. The subject seems to me of very great importance and should receive from the legislature prompt action.

While the health service of the State might be greatly benefited by changes in some other of its health laws, yet I do not deem it expedient to recommend any other changes at this time. The bills which I have recommended as those which we should ask to have the present legislature pass, are those which from my knowledge of health conditions in this State seem to me of very great importance, and it is, therefore, only these to which I have asked special attention by you. Two of them must carry appropriations to be effective, but in both cases it means an exchange of money for valuable human lives.

ROBERT CLARK KEDZIE, A. M., M. D., SC. D.

This eminent man was born at Delhi, N. Y., January 28, 1823, and died at his home at the State Agricultural College, near Lansing, November 7, 1902.

In 1873, Governor Bagley appointed him one of the first members of the State Board of Health, for the term of two years. In 1875, Governor Bagley reappointed him for the term of six years, the last four years of which he was president of the Board. In 1881, Governor Jerome appointed him for a third term as a member of the Board, but because of his duties at the Michigan Agricultural College, where for forty years he was Professor of Chemistry, he declined the appointment. Resolutions of regret at his retirement, and expressions of appreciation and thanks for his valuable services, were adopted by the Board, April 12, 1881, and are printed on page xl of the Report for that year.

Three of the first papers published by the Board, in the Annual Report for 1873, were by Dr. Kedzie,—on the Hygiene of School Buildings, Poisonous Wall Paper, and Illuminating Oils. This report is yet in frequent demand, especially because of the article first named.

Continuing the subject of poisonous paper, as chairman of the committee on poisons, etc., in 1874, Dr. Kedzie made a valuable report on this subject, and in that year he prepared one hundred books each containing a large number of specimens of wall papers, every sample of which he had tested chemically and found to contain arsenic; the books were placed in libraries in this State, many of them in libraries of ladies' library associations. The books of specimens were entitled, "Shadows from the Walls of Death, or Arsenical Wall Papers Gathered by R. C. Kedzie," and contained an explanatory article as to its preparation and the danger from living and sleeping in rooms having poisonous paper on the walls. The books were distributed where it was thought they would do the most good. The results were very valuable, educating the people to protect themselves by a judicious choice of wall paper, and helped to revolutionize the manufacture of wall paper and other articles containing arsenical coloring matter.

Dr. Kedzie devoted years to the improvement of illuminating oils so far as relates to the safety of their uses by the public. He devised the Michigan State Board of Health oil tester, a cup believed to give more accurately the actual condition of oil when it is burning in a lamp than any other test in use previous to that time. The result of his researches in this field are published in the annual reports of this Board, beginning with the first one, for 1873.

An interesting and instructive report by Dr. Kedzie of a special investigation concerning impurities and adulterations in table syrups, was published in the annual report of this Board for 1874.

He contributed to the public health service of the State that useful line of work, the sanitary convention. In his annual address for 1878, as President of the State Board of Health, Dr. Kedzie proposed the holding of sanitary conventions in different parts of the State, to consider and discuss sanitary matters, and a committee was appointed to consider the best means of inaugurating such sanitary conventions. The first convention was held in Detroit on the 7th and 8th of January, 1880, and was a complete success. These conventions have proved to be a very valuable means of educating the people along the lines of public health work.

Although the law requiring the inspection of plans of buildings for State institutions was not enacted until years later, the important work of sanitary inspection of State institutions and public buildings started when Dr. Kedzie was invited to examine the ventilation and sewerage of several State institutions. His report is printed in the annual report for 1874.

In conjunction with Secretary Baker, Dr. Kedzie worked nearly a year to perfect rules for the resuscitation of the drowned. The original draft of the rules recommended by them can be found in the report of the Board for 1874.

Before the State Board of Health was established, at the instance of Dr. Baker, then in charge of the Vital Statistics in the Department of State, he commenced observations on ozone, probably the first systematic observations of ozone in this country. He himself prepared the test-paper, and acting with Dr. Baker devised a scale for recording the results of observations, which could readily be converted into per cent, the maximum coloration being rated 10, whereas in Germany it had been 15.

He continued the observations during a series of years, from 1871 to 1880. For a few years he prepared standard ozone test-paper for the State Board of Health for the use of observers around the State. He has contributed much to the progress of meteorology in Michigan, taking or causing to be taken observations of all the principal meteorological conditions for a very long series of years—1864 to 1902.

One of the earliest and most complete contributions to the history, nature, methods and results of observations of ozone is the presidential address of Dr. Kedzie to the State Medical Society, published in the Annual Report of the State Board of Health for 1875.

A record of some of the work of Dr. Kedzie for the advancement of the public health may be found in the Annual Reports of the Secretary of the State Board of Health for every year he was connected with the Board.

Dr. Kedzie was President of the Michigan State Medical Society, of the American Public Health Association, and of the Sanitary Council of the Mississippi Valley, Vice President of the American Medical Association and of the American Association for the Advancement of Science, and was Fellow of the American Academy of Medicine.

At a special meeting of the State Board of Health, November 10, 1902, the following resolutions were unanimously adopted:

WHEREAS, The Michigan State Board of Health has been called together in special session to take action respecting the death, which occurred November 7, 1902, of Robert Clark Kedzie, M. D., for eight years a member and for four years the President of this Board; and

WHEREAS, The passing away of this brilliant, gifted, useful and truly good man is an event which well may cause all who are interested in the advancement of sanitation and the promotion of public health and welfare to pause and contemplate a period, not long passed, when sanitation was not an applied science in this commonwealth, and when the few workers in the great field of public health were hardy pioneers treading the untried paths of preventive medicine; and

WHEREAS, Among those valiant and hardy pioneers none were more effective in useful labor for the public weal than was our deceased co-laborer and late president; therefore be it

Resolved by the Michigan State Board of Health, That in view of the facts above set forth, we here and now make reverent and solemn record and acknowledgment of the inestimable value of the services of Robert Clark Kedzie in behalf of public health and welfare.

Resolved, That in our opinion, the people of this State and nation and of the entire world, owe a debt of lasting gratitude to the memory of this great man for the most useful part which he took in the inauguration and advancement of concerted systematic public effort for that greatest public good,—the eradication of unnecessary disease, the banishment of untimely and needless death and the upbuilding of a robust public health and consequent happiness and welfare.

Resolved further, That in the opinion of this Board, the value to the people of this State, and to the human race, of the voluntary labors of Doctor Kedzie in behalf of public health, are beyond estimation, and that the memory of them should be an inspiring lesson to all the people, and should form a deep incentive for the continuance of a noble work, in the commencement of which he so unselfishly and effectively coöperated.

Resolved, That as an expression of our appreciation of the value of these labors, and because of the great value of a history of them, the Secretary of this Board be requested to prepare a memoir in the form of a resumé of the work of Doctor Kedzie in the inauguration and advancement of sanitation in this State and country, and that the same be published in the Annual Report of the Board for the use of the people of the State.

GENERAL WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1903.

Much of the work of this office naturally groups itself under three heads,—the collection of information, the compilation and elaboration of information, and the dissemination of information. In the following outline that grouping is adhered to so far as is practicable without repetition.

COLLECTION AND COMPILATION OF INFORMATION.

Return of names and postoffice addresses of health officers.—There is a local board of health in every township, and in every incorporated city and village in Michigan.

Every local board of health in Michigan is required by law to appoint and constantly have a health officer, and to report his name and address to the Secretary of the State Board of Health at Lansing.

Blanks for the return of the names and addresses of health officers are sent out by the Secretary of the State Board to the local health officers about the first day of April, the law (Sec. 4411, C. L. 1897; Sec. 46, P. H. L. 1899) requiring the appointment and return to be made "within thirty days after the annual township meeting in each year."

In April, 1903, the usual demand was made upon supervisors of townships, presidents and clerks of villages, and mayors and clerks of cities, for the return of names and postoffice addresses of health officers to serve in 1903-1904. The circular and blank forms are similar to those printed on pages xiii-xiv of the report of this Board for 1884. In June, 1903, a second demand was sent to localities from which no return had been made in response to the demand in April. On the outbreak of a dangerous communicable disease in a township, city or village, in which no health officer had been reported, a third and even a fourth demand for the appointment of such officer, and the return of his name has been made; therefore, the number of health officers returned increases until the close of the year for which such officers are appointed. At the close of the fiscal year ending June 30, 1903, the numbers of health officers in townships, cities and villages returned for the years 1902-1903 were approximately as follows: Townships, 1,208; cities, 81; and villages, 315.

Through the systems of reports to the State Board of Health by its corps of correspondents, as well as by the local health officers, by the systematic searching of the local columns of country newspapers published in Michigan, and by a diligent search of the reports of deaths to the Division of Vital Statistics in the office of the Secretary of State, the Secretary of the State Board of Health often receives information of an outbreak of a communicable disease and desires to communicate at once with the local health officer; but if no health officer has been appointed in that locality, or no return of such appointment has been made, delay occurs, and before the secretary is able to establish authentic communication with the local board of health, and a health officer can be chosen, the disease may spread widely within or without the limits of a village or a township, with unnecessary sickness and loss of life. It should be said, however, that there is an increasing tendency to comply with this law, and local boards now generally act promptly and coöperate cordially with the State Board of Health in its endeavors to prevent the spread of dangerous communicable diseases.

Special reports relative to dangerous communicable diseases.—Every health officer is supplied with blanks [L] from this office, for reporting outbreaks of diphtheria, scarlet fever, typhoid fever, smallpox, measles, etc. (dangerous communicable diseases), to the Secretary of the State Board as required by law. A special blank [S] for reporting outbreaks of consumption is also supplied local health officers.

Upon the receipt of the report of an outbreak of such disease, blanks [M] for weekly reports so long as the outbreaks lasts, are sent, with a circular letter, also a number of pamphlets containing instructions for the suppression of the disease. These pamphlets are to be distributed to the neighbors of the family in which the disease is, in order to educate them to the importance of their duty under the law, and to secure their coöperation with the health officer.

About 5,872 outbreaks of such diseases were thus attended to during the fiscal year, 1903.

Later, a blank is sent to the health officer of each jurisdiction for a final report at the close of the outbreak, stating just what was done for the restriction of the disease, and with what result—the number of cases and deaths, households invaded, what disinfections were used, what exceptions, and other facts supplying data for guidance of future efforts.

The facts thus collected are compiled for publication in the annual report of the Secretary of the State Board of Health. In this annual report will be found the report of the facts relative to the dangerous communicable diseases in Michigan in the year 1902.

Annual reports by health officers for the year ending December 31, 1903.—In January, 1903, a circular [218] was sent to the health officer of each township, city and village in the State, about 1,604 in all, transmitting a blank form [I] for use in making his annual report to this office. This circular was substantially the same as circular [65] which is printed on pages viii-ix of the report for 1884. Blank form [I] for reports of health officers is printed in former reports. With the circular [218] was also transmitted a blank for a copy of a record of diseases dangerous to the public health, similar to the blank which is printed on page 271 of the report for 1882.

Where the name of the health officer has not been returned the blanks were sent to the president of the village, the mayor of the city, or the supervisor of the township, according as the vacancy occurred in a village, city or township.

In case this failed to secure the return in accordance with the State law, the aid of the prosecuting attorney was requested. This has had the effect of securing a more complete return of reports of health officers.

Annual reports by clerks of local boards of health discontinued.—Since the change of the law (Secs. 4452 and 4453, Compiled Laws 1897; Secs. 87 and 88, Public Health Laws 1899), went into effect, reports of cases of "diseases dangerous to the public health" are not made by the clerk; and, unless it has been impracticable to secure a satisfactory report from the health officer, no demand was made upon the clerk for an annual report.

Meteorological reports.—A list of meteorological observers for the calendar year 1902, with a statement of what registers were received from each, is printed in this report. The reports are summarized in an article in this report on "The Principal Meteorological Conditions in Michigan in 1902," commencing on page one of Part II. The data are of great value for the purpose of studying the causes of diseases. The observations made at the office of the Board at Lansing have been summarized weekly, and a copy placed on file in the office.

DISSEMINATION OF INFORMATION.

Distribution of information how to restrict and prevent dangerous communicable diseases.—Whenever information was received of the first occurrence of diphtheria, scarlet fever, typhoid fever or typho-malarial fever, measles, whooping-cough, consumption, smallpox or cerebro-spinal meningitis, copies of a document on the restriction and prevention of the disease reported were immediately sent to the health officer with a request that he distribute them where they will be most likely to be read, and it was suggested that the neighbors of those families in which the sickness occurs would be most likely to read them at such times of danger, and it was thought that after reading them they will be most likely to coöperate with the local health officer for the restriction of the disease. Thousands of pamphlets on the most dangerous communicable diseases are distributed by the State Board of Health in this manner, in localities where the disease treated of in the pamphlet is present. They are being distributed in this way all the time, because there is no time when the State is free from consumption, scarlet fever and diphtheria, these being the most important of the dangerous communicable diseases in Michigan. Copies of the documents on diphtheria, scarlet fever and smallpox, in German or in Dutch, are also sent when it is thought they can be used to advantage. Owing to frequent requests for documents in French, Polish, Swedish and Danish Norwegian, translations of a leaflet [47] on contagious diseases have been made into each of these languages, and copies sent to local boards of health when requested.

A record is kept of reports received, and of correspondence relative to each outbreak of a dangerous communicable disease of which the office receives information. A compilation of such information relative to the most important diseases is published in this volume.

Printing and distribution of the secretary's annual report.—Comparatively few copies of the annual report of the secretary are published; the whole number is not so large as the number of officers and members of local boards of health in Michigan. In accordance with the provisions of Section 10, Act No. 44, Laws of 1899 (Sec. 14, Public Health Laws 1899), only 4,000 copies of the annual report are published, 2,000 copies less than have ordinarily been published, but about the same number of copies is allowed for distribution by the Secretary of the State Board of Health (about 3,800). The reports are sent in exchange to sanitary journals, other State Boards of Health, local health officials in Michigan, city boards of health in other States, health officials in other countries, libraries, correspondents of the Board, and to persons who request copies of the report.

Instructions to newly appointed health officers.—As fast as the names and addresses of health officers to serve in 1902-1903 were received, a copy of the bulletin* [120] detailing the duties of health officers and of local boards of health, was sent to each one who had not served during the preceding year, together with blanks "L" and "M" for the prompt report of any dangerous communicable diseases, and sample copies of pamphlets on the restriction and prevention of diphtheria, scarlet fever, typhoid fever, measles, whooping-cough, meningitis, smallpox and consumption; also a slip [224] relative to consumption being a dangerous communicable disease, and a short statement relative to its restriction and prevention; a leaflet [281] on the modes of spreading and the best methods for the restriction and prevention of dangerous communicable diseases; several leaflet diagrams showing the results for recent years in the restriction of diphtheria, scarlet fever, typhoid fever, measles and consumption, and two diagrams showing a comparison between the numbers of deaths from typhoid fever in sewered and unsewered localities.

The Teachers' Sanitary Bulletin is now in its sixth volume. During the fiscal year, 1903, 25,000 copies for each of the months of July, September, October, November, and December, 1902, and for February, May, and June, 1903; 23,000 copies for August, 1902; 26,000 copies for January and April, 1903, and 30,000 copies for March, 1903, were printed.

Aside from a large number of shorter articles, and items relating to various phases of public health work and teaching, the following articles appeared in the Bulletin: "Milk as a Conveyer of Disease," and "Medical Inspection of Schools," by Guy L. Kiefer, M. D. (August and December, 1902); "Relations of Bovine Tuberculosis to Human Tuberculosis," by D. E. Salmon, D. V. M. (October, 1902); "Municipal Quarantine," by James A. King, M. D. (November, 1902); "Pneumonia: The New Captain of the Men of Death," by Arthur R. Reynolds, M. D. (January, 1903); "The Local Slaughter-House and Meat Inspection," by Rev. Caroline Bartlett Crane (February, 1903); "Hydrophobia—Rabies, Its Restriction and Prevention," by F. G. Novy, Sc. D., M. D. (March, 1903); "Mosquitoes as Bearers of Malaria and Yellow Fever," by Hon. Frank Wells (April, 1903); and "The Relation of the State Laboratory of Hygiene to the Health Work of the State," by Victor C. Vaughan, M. D. (June, 1903).

This Bulletin is published to enable the teachers in the public schools of the State to better comply with the provisions of Act 146, of 1895, which requires that facts relative to the modes of spreading, and best measures for the restriction and prevention of the dangerous communicable diseases be taught in every public school. It is sent gratuitously to all teachers whose names and addresses can be obtained. The secretary will be grateful for all information relative to the names and addresses of teachers in Michigan, or changes therein.

Reprints.—Reprints of articles in the report and in proceedings of sanitary conventions, have been made in pamphlet form, and sent in answer to queries in letters that can be best answered in that manner.

Instructions to local health officers by telephone, telegraph, etc.—There are in Michigan about 4,500 officers of local boards of health (presidents, clerks, and health officers), many of whom are newly appointed each year, and coming to the work for the first time, need to ask many questions in order to be best prepared to serve the people in their several localities. As fast as such emergencies arise such questions are replied to by telephone, telegraph, letters, or otherwise as the occasion demands. This is one of the important functions of the central office, of the secretary and executive officer of the State Board of Health.

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*Published under Sec. 15, Act 44, Laws of 1899.

Diagrams of instructive experience in Michigan.—Diagrams showing the favorable results of isolation and disinfection of diphtheria, scarlet fever, typhoid fever, smallpox, and the generally favorable results of isolation and disinfection, lives saved by public health work in Michigan, deaths from typhoid fever in sewered and unsewered localities and in cities before and after the introduction of sewerage, the relation of low water in wells and the deaths from typhoid fever, have been printed and largely distributed. The evidence relative to the effect of isolation and disinfection as a preventive of the dangerous communicable diseases, gains strength as shown by the diagrams for each succeeding year compared with periods of years. The diagrams prove that in those localities in which isolation and disinfection of diphtheria and scarlet fever were enforced, only about one-fifth as many deaths occur as in those localities where isolation and disinfection were neglected. The diagrams relative to the other diseases show a greater or less proportion of life-saving through isolation and disinfection.

Pamphlets and other publications of the office.—Aside from a number of diagrams and leaflets which were printed during the year but which cannot well be enumerated here for lack of space, the third amended edition of "Embalming, and The Burial, Removal and Transportation of Infected Persons and Corpses," was printed in September, 1902; the fifth edition of "Restriction and Prevention of Whooping-cough," and the ninth edition of "Relative to Teaching How Dangerous Diseases are Spread, and How Restricted;" and the thirteenth edition of "Dangerous Communicable Diseases: How Spread, How Restricted and Prevented," were printed in November, 1902; the nineteenth edition of "The Prevention and Restriction of Typhoid Fever," was printed in December, 1902; the second edition of "Vaccination and Revaccination,—the Prevention of Smallpox;" the nineteenth edition of "Restriction and Prevention of Scarlet Fever," and the nineteenth edition of "Restriction and Prevention of Diphtheria," were printed in January, 1903; the ninth edition of "Restriction and Prevention of Consumption," was printed in February, 1903; and the second amended edition of "Nuisances: Their Abatement and Prevention," and the twelfth edition of "The Restriction and Prevention of Measles," were printed in April, 1903; reprints were also made of some of the articles in the annual report for 1902.

Immigrants possibly exposed to dangerous communicable diseases.—During the fiscal year, 1903, six notices were received from the U. S. Commissioner of Immigrants at Philadelphia, Pa., that measles had occurred on board two steamships; scarlet fever on board one steamship; diphtheria on board one steamship; measles and favus on board one steamship; and measles and varicella on board one steamship, arriving at that port. Twenty-four notices were received from the Dominion Immigration officers, Canada, that measles had occurred on board thirteen steamships; chicken-pox on board three steamships; scarlet fever on board two steamships; diphtheria on board two steamships; smallpox on board one steamship; mumps on board one steamship; typhoid fever on board one steamship; and measles and typhoid fever on board one steamship, arriving at Canadian ports. The notices give the names and destinations of immigrants on board those steamships intending to settle in Michigan. Copies of these notices, including the lists of the names of the immigrants, were promptly sent from this office to the health officers of the jurisdictions where the immigrants intended to settle. When a disease, similar to that to which immigrants have been exposed, occurs within sixty days after their arrival in any locality in the State, indicating a probable connection between such outbreak and the arrival of the immigrants, mention is made of the same in the article on "Communicable Diseases in Michigan in 1902," in a subsequent part of this report.

Publication of proceedings of meetings of the State Board of Health.—Abstracts and brief accounts of the proceedings of meetings of the State Board are prepared, neostyled, and distributed as soon as practicable after each meeting. Abstracts of the minutes of meetings have in former years been printed in Part I of the secretary's annual report, but since the report for 1899 they have been omitted from the report on account of the restriction of the size of the volume; but a record is kept in the office of the secretary. The distribution of these abstracts is not the same for all meetings, being to different classes of persons according to the nature of the contents, as the action of the Board or its deliberations may be appropriate. In some instances they are sent to sanitary and medical journals, in others to teachers, health officers and others, and frequently to the members of boards of control of the different State institutions.

Secretary's quarterly reports of work in the office.—At the close of each quarter, the secretary prepares a brief report of the work done in the office. This report is presented, and portions of it sometimes read at the next regular meeting; and, if the abstract of the proceedings of the meeting is printed, this report is printed in the same pamphlet. It has not been practicable to print the quarterly abstract of proceedings of meetings in this fiscal year.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING JUNE 30, 1903.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN—In compliance with Section 5 of Article II of the by-laws of this Board, the following report of the "Nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted:

Preceding reports should enable one to learn the items of property on hand at the beginning of the fiscal year 1902. My last report is printed on pages xxiv-xxv of the Annual Report for 1902. Since last report, instruments and articles of a similar nature have been purchased as follows:

*Photo-engraved plates purchased.**

Thirty-six plates were purchased (31 photo-engraved, and 5 half-tone), as follows:
Sixteen plates relating to the meteorological conditions in Michigan in 1901.
Five plates relating to weekly reports of sickness in Michigan in 1901.
One plate—Comparison of death-rates in Michigan from smallpox before and since the State Board of Health commenced to labor for its restriction.
One plate—Deaths in Michigan, 10 years, 1888-1897 (page size).
One plate—Deaths in Michigan, 10 years, 1888-1897 (small size).
One plate—Distribution of consumption in Michigan in 1901.
One plate—Isolation and disinfection restricted diphtheria in Michigan in 1901.
One plate—Comparative sickness in Michigan, 10 years, 1892-1901.
One plate—Cancer in Michigan, 1897-1900.
One plate—Isolation and disinfection restricted measles in Michigan, 12 years, 1890-1901.
Five plates—(half-tone) Rabies in cows.
One plate—Isolation and disinfection restricted scarlet fever in Michigan in 1901.
One plate—Plat of part of the city of San Francisco, California, showing location of cases of the plague in "Chinatown."

Property loaned.

Many photo-engraved plates were loaned to Robert Smith Printing Co., State Printers and Binders, Lansing, to be used in printing annual reports and other publications of this Board. Most of these plates have been returned, but a few still remain charged to them in the property book of this office. The plates will probably be returned as soon as the State Printers are through with them.

Instruments purchased since last report.

One maximum self-registering thermometer.
One minimum self-registering thermometer.
One steel spring bow pen, 3 inch.
One drawing pen, 4 inch.
One drawing pen, 5½ inch.
Ten yards Universal drawing paper.
One-half dozen assorted camel hair brushes.
One dozen 24-inch rules for rain gauges.
One hammer.
One screwdriver.
One lock to replace the old one on the shelter for meteorological instruments.

Meteorological instruments issued.

One maximum self-registering thermometer (to replace one disabled by long use) to S. E. Wait, Traverse City.

One barometer and box for protection, one dry-bulb thermometer, one wet-bulb thermometer, boards, clips, cup and wick, one minimum and one maximum self-registering thermometer, with boards, etc., for hanging, one galvanized iron rain gauge with measuring stick, and tube to catch overflow, to C. E. Barnes, Stony Lake.

Meteorological instruments returned.

One maximum self-registering thermometer (disabled by long use) by S. E. Wait, Traverse City.

One barometer and box for protection, one dry-bulb thermometer, one wet-bulb thermometer, boards, clips, and cup, one maximum and one minimum self-registering thermometer, with boards, etc., for hanging, one rain gauge and tube to catch overflow, by Mrs. Benita A. Dyer, Birmingham.

Meteorological instruments accidentally broken while in use by observers.

One dry-bulb theremometer, by the observer for this office while taking the temperature of the water in the observation well.

Meteorological instruments and other property on hand.

Eight standard barometers (including one in use at this office).
Five maximum self-registering thermometers (including one in use at this office).
Six dry-bulb thermometers (including one in use at this office).
Four wet-bulb thermometers (including one in use at this office).
Two rain gauges (including one in use at this office).
Eleven measuring sticks for rain gauges (including one in use at this office).
One standard thermometer.
Eight registering thermometer boards (including one in use at this office).
Fourteen psychrometer boards (including one in use at this office).
Two psychrometer cups (including one in use at this office).
Eight minimum thermometer clips.
Six psychrometer clips.
Nine screw bolts for registering thermometers.
Ten pins for registering thermometers.
Seven barometer boxes (including one in use at this office).
Two caps for overflow tubes.

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*In some instances out of one fund, and in other instances from another fund; some, for illustrating the annual report of the Board, were ordered paid for by the Board of State Auditors.

Two large galvanized iron pails to measure snowfall.
One Draper's self-registering thermometer.
Two anemometers for use in this office.
Two circular magnifying hand glasses.
Nine psychrometer cups, injured by use, can be repaired.
Four psychrometer cups, spoiled by rust and long use.
Thirty-six thermometers (includes all since observations have been taken).
One hard rubber triangle, 13 inch.
One hard rubber triangle, 6 inch.
One dotting instrument.
One adjustable curve ruler.
One parallel ruler, wood.
One parallel ruler, hard rubber.
One bull's-eye lamp, for taking meteorological observations.
Two boxwood triangular scales, 12 inch.
Two steelspring bow pens, 3 inch.
Two drawing pens, 4 inch.
Two drawing pens, 5½ inch.
One divider, 5 inch.
One compass, with fixed needle point, pen, pencil point and lengthening bar.
One border pen for broad lines, 6½ inch.
Three-fourths dozen camel hair brushes, assorted sizes.
Ten yards Universal drawing paper.
Three thousand two hundred and forty slips ozone test paper.
One hundred and twenty sheets ozone test paper.
One worn out anemometer spindle.
One hammer.
One screwdriver.

The following table shows the amount and kind of hard paper there was on hand at the time of making the last report, the amount purchased during the year ending June 30, 1903, the amount used, and the amount on hand at close of year:

Kind of paper.	On hand at last report.		Purchased since last report.		Used during the fiscal year.		On hand June 30, 1903.	
	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.
Flat	7	132	10	....	2	202	14	430
Crown	4	100	11	....	6	188	8	412
Demy	13	453	15	....	1	476	26	477
B. Hornet (linen)	1	282	3	....	2	32	....	250
Folio post	83	348	80	....	39	220	124	128
Medium	4	68	2	....	....	364	5	204
Imperial	1	....	....	....	....	....	1	....
Letter heads, office (linen)	....	5,000	....	6,800	....	9,200	....	2,600
Letter heads, members (linen)	....	650	....	2,000	....	1,416	....	1,234
Foolscap	....	360	....	....	....	135	....	225
Legal cap	....	258	....	....	....	72	....	186
Blotting paper	1	....	....	....	....	330	....	170
Blue cover paper	6	300	....	....	5	....	1	300
P. O. paper	1	200	....	....	....	....	1	200
Book paper, S. S. S. white	....	400	....	....	....	....	....	400
Manilla paper	3	390	....	....	3	100	....	290

There are now on hand 6,410 sheets of hard paper of half-letter size. There were about 269,354 envelopes on hand at the time of making the last report; 148,125 of the various kinds used in the office have been purchased since, making a total of 417,479. There are now on hand 96,223 printed envelopes, and 122,376 blank envelopes, making a total of 218,599. About 198,880 have been used in the work of the office.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER ACTS 81, 1873, 241, 1881, AND 140, 1901, TO PAY THE SALARY OF THE SECRETARY, THE INCIDENTAL EXPENSES OF THE OFFICE, THE EXPENSES FOR SANITARY CONVENTIONS, INSTRUMENTS, REPRINTS, ETC.), AS PER VOUCHERS 3455, 3460, 3462, 3479-3494 INCLUSIVE, 3496-3498, 3500, 3502-3594 INCLUSIVE, 3596-3601, 3603-3612, 3615-3620, 3630, 3632, 3643 AND 3645, DURING THE FISCAL YEAR ENDING JUNE 30, 1903.

Expenses of members:—	
Attending meetings	$128 29
Other official	619 36
Engraving, drawing, etc	14 85
Instruments and books	183 69
Paper, stationery, etc	774 44
Postage	2,080 78
Printing and binding	833 69
Secretary	3,000 00
Expressage	49 21
Telegrams	31 01
Telephone	46 24
Miscellaneous	126 15
Total expenditures	$7,887 71
Unexpended balance turned over to State Treasurer	112 29
Amount of appropriation	$8,000 00

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (FOR EDUCATIONAL WORK IN CONNECTION WITH THE TEACHERS IN THE PUBLIC SCHOOLS) UNDER ACT 142, 1897, AS PER VOUCHERS 200-201, 203, 205-228 INCLUSIVE, 230 AND 233, DURING THE FISCAL YEAR ENDING JUNE 30, 1903.

Engraving, drawing, etc	$2 05
Instruments and books	100 00
Paper, stationery, etc	1,176 55
Postage, $317.57 used; but out of funds previously appropriated	....
Printing and binding	774 84
Expressage	46 65
Telegrams	33
Miscellaneous	2 36
Total expenditures	$2,102 78
Unexpended balance turned over to State Treasurer	397 22
Amount of appropriation	$2,500 00

EXPENDITURES ON ACCOUNT OF THE BOARD.

Note.—The appropriations ($10,500.00) at the disposal of the State Board of Health are for certain specified purposes, not including clerk hire, the publication of the annual report, or the expenses in the examination of plans for public buildings; those expenditures *on account of*, but not by the Board, are provided for by other acts of the legislature than those appropriating money to be expended by the Board: and the accounts are kept in other offices, not in the office of the State Board of Health. The accounts for clerk hire are kept by the Auditor General, and are reported in his annual report; the accounts for the publication of the annual report of this Board, and in the examination of plans for public buildings, are kept by the Board of State Auditors, and are published in the annual report of that Board.

Respectfully submitted,
HENRY B. BAKER,
Secretary.

SUMMARY FROM THE QUARTERLY REPORTS OF WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH IN MICHIGAN DURING THE SIX MONTHS ENDING JUNE 30, 1903.

For each regular meeting of the State Board of Health, the Secretary prepares a report of the work in the office, and of the condition of health in Michigan, during the preceding quarter.

In another article, further on in this volume, entitled "Communicable Diseases in Michigan During the year 1902," is a summary, relative to the year 1902, abstracted from the quarterly reports.

This article is a similar summary, from the quarterly reports, for the succeeding six months, being the first six months of the calendar year 1903,—the last half of the fiscal year 1903, for which year this volume is the annual report. This article brings the subject up to the latest date possible, for this report.

A summary of a few portions of the quarterly reports during the six months ending June 30, 1903, is as follows:

Dangerous communicable diseases.—Relative to the dangerous communicable diseases in Michigan, the number of instances in which action was taken during the six months, are as follows: For consumption 746; for meningitis 200; for typhoid and typho-malarial fever 337; for diphtheria 301; for whooping-cough 199; for measles 468; for scarlet fever 459; and for smallpox 471. Total for the eight diseases, 3,181.

The number of communications relative to dangerous communicable diseases, received and placed on file, was 14,270.

The number of communications relative to dangerous communicable diseases sent out, was 12,871.

The final reports received and filed were: For consumption 925; for meningitis 209; for typhoid and typho-malarial fever 290; for diphtheria 288; for whooping-cough 120; for measles 323; for scarlet fever 522; and for smallpox 402. Total for the eight diseases 3,079.

The registration and return of deaths in Michigan, to the State Department, has resulted in giving this office the first information of the occurrence of 584 deaths from consumption; 178 deaths from meningitis; 90 deaths from typhoid and typho-malarial fever; 61 deaths from diphtheria; 77 deaths from whooping-cough; 23 deaths from measles; 12 deaths from scarlet fever; and 1 death from smallpox. A total for the eight diseases of 1,026.

The local columns of 6,031 newspapers have been looked over for reports of occurrence of communicable diseases. (This work is usually done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office first information of the alleged occurrence of 22 cases of consumption; 1 case of meningitis; 32 outbreaks of typhoid and typho-malaria fever; 5 outbreaks of diphtheria; 10 outbreaks of whooping-cough; 35 outbreaks of measles; 9 outbreaks of scarlet fever; and 3 outbreaks of smallpox. A total for the eight diseases of 117. To what extent the reports of these alleged outbreaks were verified is shown in the accompanying table.

TABLE 1.—FIRST SIX MONTHS OF 1903.—*Exhibiting the number of instances in which action was taken relative to consumption, meningitis, typhoid fever, diphtheria, whooping-cough, measles, scarlet fever and smallpox, from January 1 to June 30, 1903; the per cent of reports, first information concerning which was received through the newspapers; the per cent of newspaper reports which were confirmed by the health officer or by the death certificate; the per cent of reports which were denied, and the per cent of reports relative to which no reply was received, from the health officer.*

	Reports from all sources January 1 to June 30, 1903.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Consumption	746	3	68	23	9
Meningitis	200	1	100	0	0
Typhoid fever	337	9	38	31	31
Diphtheria	301	2	40	20	40
Whooping-cough	199	5	70	10	20
Measles	468	7	43	26	31
Scarlet fever	459	2	67	22	11
Smallpox	471	1	34	33	33
Average for the 8 diseases		4	50	25	25

Work in connection with sickness statistics.—When a return of the name of a new health officer was received, the printed circular [180] demanding the weekly card reports of sickness, and a hektographed circular letter describing the plan of making the card reports, together with supplies for making the reports, were sent to the health officer of each city and village, who were physicians, in active general practice of medicine. It must be remembered that the following applies only to the work on sickness statistics for the first six months of 1903, and that for the work of the calendar year 1902, reference must be made to the article on sickness statistics beginning on page 55 of this report. During the first six months of the year 1903, 4,263 blank report, receipt and return postal cards, 320 weekly record books, and 573 printed, hektographed and typewritten letters, were mailed to health officers of cities and villages, and to such physicians, in active practice of medicine, who have expressed a willingness to make the reports voluntary. About

2,709 weekly postal card reports were received and entered on the register.

The sickness statistics of Michigan, based upon these weekly card reports, are probably the most important sickness statistics in the world, and are made especially useful for the purpose of studying the climatic causation of diseases, by reason of the excellent meteorological statistics which have been collected for a long series of years. The general plan of the weekly card reports, the sickness statistics obtained from the compilation of the weekly card reports received during the year 1902, and the data obtained from the meteorological observations during the year 1902, may be found on pages 1 to 99 of this report.

An ephemeral use is made of the data contained in the weekly card reports, and of the meteorological observations at Lansing, by the publication of weekly, monthly and quarterly bulletins, "Health in Michigan." Samples of the several bulletins may be found on page 85, Report for 1891, pages lxxix, and xcii-xciii, report for 1894, and pages lxxxvi-lxxxvii, report for 1898. During the first six months of 1903 about 115 copies of the weekly bulletin were mailed each week, and about 126 copies of the monthly bulletin were mailed each month, to members of the State Board of Health and other officials and persons interested in keeping a "finger on the public pulse," also to a number of newspapers and sanitary and medical journals. The weekly and monthly bulletins are mentioned on pages 57 and 58 of this report.

Meteorology at one central station, and sickness throughout Michigan from all causes, during the first six months of 1903, being the last six months of the fiscal year compared with the first six months of 1902.—A comparison of meteorological conditions, at Lansing, for the first six months of 1903, with the meteorological conditions for the first six months of 1902, show that in 1903 the prevailing direction of the wind was southwest and northeast instead of southwest, the velocity .8 of a mile per hour less, the average temperature .94 of a degree higher, the average daily range of temperature .05 of a degree greater, the average daily range of atmospheric pressure .018 of an inch greater, the precipitation .27 of an inch less, the absolute and relative humidity more, the day and night ozone less, and the depth of water in the observation well 21 inches more. This data relative to the calendar year 1902 is printed in the article on meteorology, beginning on page 1 of this report.

Compared with the first six months of 1902 the reports from all sources indicate an increased prevalence in the sickness from cholera morbus, diphtheria and whooping-cough; and a decreased prevalence in dysentery, in the first six months of 1903.

The weather and the health in Michigan in the first six months of 1903, compared with the average for the corresponding six months in the ten years 1893-1902.—A comparison of meteorological conditions, at Lansing, for the first six months of 1903, with the average for the corresponding six months in the ten years, 1893-1902, shows that in 1903 the prevailing direction of the wind was southwest and northeast, instead of southwest and northwest, the velocity .7 of a mile per hour less. the average temperature 1.38 degrees higher, the average daily range of temperature .26 of a degree greater, the average daily range of atmospheric pressure the same, the precipitation .2 of an inch more, the absolute humidity more, the relative humidity the same, the day and night ozone less, and the depth of water in the observation well 14 inches more.

Compared with the average in the corresponding six months in the ten years, 1893-1902, the reports from regular observers indicate that typhoid fever, scarlet fever, smallpox and whooping-cough were more prevalent than usual; and consumption, intermittent fever, remittent fever, dysentery and erysipelas, were less prevalent than usual, in the first six months of 1903.

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[PART II.]

PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN IN 1902.

COMPARISONS OF CONDITIONS IN 1902 WITH THOSE IN PRECEDING YEARS.

A COMPILATION OF REPORTS BY OBSERVERS FOR THE STATE BOARD OF HEALTH AND FOR THE UNITED STATES WEATHER BUREAU.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH.

In the annual reports of this Board, there has been published for each of the years 1877 to 1901, inclusive, a summary relative to the principal meteorological conditions observed during the year. This paper continues the subject for the year 1902. The names of the observers for that year, and the months in that year for which copies of registers of meteorological conditions were received from each, are stated in Table I. In Table II, is given the latitude, longitude, and elevation of each of these stations. In the tables, reports received from any observer for less than half the year have not been used; in some instances the "casual phenomena," not in tabular form, are used.

The principal conditions treated in the tables are temperature, relative and absolute humidity of the air, cloudiness, fogs, rainfall, groundwater levels, ozone, velocity and direction of the wind, and pressure of the atmosphere. The facts in a table on the subject of each such important meteorological condition is illustrated by a diagram representing to the eye variations in the given condition from month to month through the year, at the several localities represented.

Some of these tables give not only the meteorological conditions for the year and month under consideration, but they also contain, for purposes of comparison, statements of the average conditions for the longest period available in each case.

In the latter part of the annual report for 1886, there was published an article on "The Causation of Pneumonia," in which extensive use was made of meteorological statistics, especially those relating to the meteorology of Michigan. In the annual report for 1887, in an article on "The Causation of the Cold-Weather Diseases," influenza, tonsillitis, bronchitis, scarlet fever, diphtheria, and smallpox are proved to sustain very close relations to meteorological conditions. Extensive use of meteorological and sickness statistics is made in the report for 1887, in an article entitled "The Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-Passages." In the report for 1891, "Abstract of Proceedings, April 14, 1891," in a discussion on the subject of "The Causation of Influenza," is an important use of the meteorological data, with diagrams and other evidence, showing how closely influenza is associated with atmospheric temperature, humidity, ozone, and wind. In the report for 1891, page cxxvii, is an article entitled "Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-Passages in Colorado," in which are also data relative to other States and countries. In the report for 1894, pages clix-ccxiv, is a paper on "The Causation of Influenza and Allied Diseases with Suggestions for their Prevention," in which important use is made of the meteorological data collected in Michigan since 1877. In each of the annual reports of this Board since that for the year 1877, considerable use has been made of the sickness statistics in Michigan for the complete study of which, data of the meteorological conditions coincident with the sickness is required. On subsequent pages of this report, for the year 1903, in the article on "The time of greatest prevalence of each disease in Michigan, in 1902," is a table showing the relation of certain meteorological conditions to the prevalence of typhoid fever and diarrhea in Michigan in 1902.

The article in this annual report relative to "The Time of Greatest Prevalence of Each Disease in Michigan in 1902," based upon weekly reports of sickness in Michigan, may well be studied in connection with this article, the main purpose of which is to serve as a basis for studies of the causes of diseases.

It is believed that there is nowhere else so complete a statement of the facts relating to meteorology of Michigan as is here presented, for any use for which such knowledge may be needed, now or hereafter.

TABLE I.—*Names of observers whose reports are summarized in the following meteorological tables and diagrams, their places of observation, and the counties and geographical divisions of the State in which these places are situated, and months for which reports were received from each observer.*

Name of observer.	Place of observation.	County.	Divisions of the State.*	Months (inclusive) for which registers were received.
Henry R. Patrick, observer, U. S Weather Bureau	Marquette	Marquette	U. P.	January to December.
A. G. Burns, observer, U. S. Weather Bureau	Sault Ste. Marie	Chippewa	U. P.	January to December.
S. E. Wait	Traverse City	G'd Traverse.	N. W.	January to December.
F. H Duff, observer, U. S. Weather Bureau	Alpena	Alpena	N. E.	January to December.
D. W. Mitchell, M. D.	Harrisville	Alcona.	N. E.	January to December.
W. H. Fallon, observer, U. S. Weather Bureau	Grand Haven	Ottawa	W.	January to December.
J. W. Cronk, observer, U. S Weather Bureau	Port Huron	St. Clair	B. & E.	January to June.
Edward A. Brown, observer, U. S. Weather Bureau	Port Huron	St. Clair	B. & E	July to December.
John S. Caulkins, M. D	Thornville	Lapeer	B. & E	January to December.
Prof. R. C. Kedzie	Agricultural College	Ingham	C.	January to December.
Wm. M. Force	Office State B'd of Health, Lansing	Ingham	C.	January to December.
Asaph Hall, Jr., Director, Detroit Observatory	Ann Arbor	Washtenaw	S. C.	January to December.
Mrs. Benita A. Dyer	Birmingham	Oakland	S. E.	Jan. to April, June and July.
N. B. Conger, Inspector Weather Bureau	Detroit	Wayne	S. E.	Feb. to April, June to Sept., Nov. and Dec.
C. D. C. Thompson, observer, Weather Bureau	Detroit	Wayne	S. E.	Jan., May and October.

* The counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

TABLE II.—*Latitude and longitude, elevation above sea level, and the average temperature and average barometric pressure in 1902, at meteorological stations in Michigan,—the names of the stations being arranged in order by latitude, highest first.*

Localities in order of latitude, those farthest North, first.	Latitude North.	Longitude West from Greenwich.	Altitude (approximate) above sea level.—Feet.	Height of mercury in cistern of barometer above sea level.—Feet.	Average temperature 1902. Degrees Fahr.	Average atmospheric pressure 1902. Inches of mercury corrected for temp.
Marquette	46°34′	87°24′	669.	....	....	....
Sault Ste. Marie	46°30′	84°21′	607.	....	....	....
Alpena	45°5′	83°3′	587.	....	....	....
Traverse City	44°45′	85°40′	598.	605.	41.16	29.266
Harrisville	43°40′	83°30′	616.	....	43.62	29.289
Grand Haven	43°5′	86°18′	590.	....	....	....
Port Huron	43°0′	82°26′	602.	....	....	....
Thornville	* 42°55′	* 83°10′	† 975.	† 980.	47.68	28.914
Agricultural College	42°44′	84°29′	820.	834.	47.24	29.000
Lansing, S. B. of H	‡ 42°44′	‡ 84°33′	§ 900.	917.	48.19	29.058
Birmingham	42°30′	83°10′	....	....	....	....
Detroit	42°20′	83°3′	585.	....	....	....
Ann Arbor	42°17′	83°44′	930.	936.	47.94	29.023

* Estimated from lines on a map of Michigan, issued by the General Land Office, Department of the Interior, 1878. For stations having no reference mark, the latitude and longitude were stated by the observer on the meteorological reports received.

† Estimated from data in Tackabury's Atlas of the State of Michigan.

‡ The exact latitude and longitude of the astronomical post placed in the ground near the new Capitol at Lansing, by the U. S. Lake Survey in 1875, as determined by the observations then made, is 42° 43′ 53.11″ N and 84° 33′ 19.68″ W.

§ Estimated from comparisons of the barometrical observations at Lansing, Port Huron, and Grand Haven for the four years, 1879-82.

NOTE.—Green's standard barometer was used at the above stations for the year 1902.

TABLE III.—*Average temperature by year and months, for the year 1902, and the average for the 25 years, 1877-1901. These averages are for groups of several stations in Michigan.*

Years, etc.	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 25 yrs., 1877-1901	46.51	21.98	22.77	29.89	45.11	56.43	66.64	71.13	68.61	61.73	49.88	36.30	27.69
1902	46.80	22.93	21.11	37.45	44.95	57.06	61.53	71.09	65.62	59.54	49.54	44.42	26.41

TABLE IV.—*Average temperature by year and months, for the year 1902 and the average for the 23 years, 1879-1901, at the office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 23 yrs., 1879-1901	47.47	22.84	23.34	31.25	46.73	58.25	68.31	72.24	69.13	62.01	50.45	36.83	28.23
1902	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02

TABLE V.—*Average temperature by year and months, for the year 1902, and the average for the 38 years, 1864-1901, at the Agricultural College, Michigan.*

Years, etc........	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug	Sept.	Oct.	Nov.	Dec.
Av. for 38 yrs., 1864-1901......	46.70	22.14	23.14	30.87	46.22	58.06	67.90	71.53	69.01	60.80	48.71	35.59	26.57
1902................	47.24	22.09	19.52	38.37	45.80	60.19	63.78	72.62	64.75	59.38	49.98	44.12	26.28

Meteorological characteristics of the year 1902 in Michigan.—At the several meteorological stations, in different parts of the State, the average temperature for 1902 was .29° higher than the average for the preceding twenty-five years; the annual range of temperature was 18° lower than in 1901, and 17° lower than the annual range for the preceding twenty-five years; the average monthly range of temperature was 5° less than in 1901, and 10° less than the average for the preceding twenty-five years. The daily range of temperature was .50° less than in 1901, and 1.17° less than the average for the preceding twenty-three years. The average cloudiness was two per cent greater than in 1901, and three per cent greater than the average for the preceding twenty-five years; the rainfall (rain and melted snow) was 5.23 inches more than in 1901, and .61 of an inch more than the average for the preceding twenty-five years; the average atmospheric pressure was .032 of an inch less than in 1901, and .041 of an inch less than the average for the preceding twenty-five years.

In Table VI. is given by year and months, a comparison of conditions in 1902, in Michigan, with those in 1901, and with the averages of periods of years. Naming the months in order of greatest difference, November, March, January and May were months in which the average temperature in 1902 was higher than the average for corresponding months in the preceding twenty-five years; June, August, September, February, December, October, April and July were months in which the average temperature in 1902 was lower than the average for corresponding months in the preceding twenty-five years.

TABLE VI.—*Statements of meteorological conditions in the year, and in each month of the year 1902, compared with the annual and monthly averages for 1901, and for several stated periods of years. These statements and averages are for groups of several stations in Michigan.*

Meteorological conditions.	1902 Compared with averages for previous years.		In 1902 more (+), or less (—), than in 1901.	Meteorological conditions.	1902 Compared with averages for previous years.		In 1902 more (+), or less (—), than in 1901.
	No. of years averaged, end'g with 1901.	More (+), or less (—), in 1902 than the average for previous years.			No. of years averaged, end'g with 1901.	More (+), or less (—), in 1902 than the average for previous years.	
YEAR 1902.				YEAR 1902. *Continued.*			
Av. temp	25	+.29°	+.08°	Cloudiness	25	+3 per ct.	+2 per ct.
Range of temp.*	25	—17°	—18°	Rainfall	25	+.61 in.	+5.23 in.
Av. monthly range of temp *	25	—10°	—5°	Atmospheric pressure	25	—.041 in.	—.032 in.
Av. daily range of temp.*	23	—1.17°	—.50				
JANUARY.				FEBRUARY.			
Av. temp	25	+.95°	—1.18°	Av. temp	25	—1.66°	+4.45°
Range of temp.*	25	—16°	—13°	Range of temp.*	25	—9°	+14°
Av. daily range of temp.*	23	—1.17°	+.07°	Av. daily range of temp*	23	—.50°	—.02°
Cloudiness	25	—4 per ct.	—8 per ct.	Cloudiness	25	—10 per ct.	—5 per ct.
Rainfall	25	—1.41 in.	—.87 in	Rainfall	25	—1.36 in.	—.39 in.
Atmospheric pressure	25	+.036 in.	+.071 in.	Atmospheric pressure	25	—.102 in.	—.092 in.
MARCH.				APRIL.			
Av. temp	25	+7.56°	+5.64°	Av temp	25	—.16°	+1.39°
Range of temp.*	25	—3°	—12°	Range of temp.*	25	—3°	+6°
Av. daily range of temp *	23	—.56°	+.90°	Av. daily range of temp.*	23	—1.32°	—.25°
Cloudiness	25	—7 per ct.	—17 per ct.	Cloudiness	25	+5 per ct.	+5 per ct.
Rainfall	25	+.22 in.	—.20 in.	Rainfall	25	—.67 in.	+.08 in.
Atmospheric pressure	25	—.045 in.	+.098 in.	Atmospheric pressure	25	—.089 in.	—.199 in.
MAY.				JUNE.			
Av. temp	25	+.63°	+1.78°	Av. temp	25	—5.11°	—6.43°
Range of temp.*	25	+4°	+15°	Range of temp.*	25	—10°	—12°
Av. daily range of temp.*	23	—.53°	+1.07°	Av. daily range of temp.*	23	—2.17°	—1.59°
Cloudiness	25	+2 per ct.	—7 per ct.	Cloudiness	25	+14 per ct.	+18 per ct.
Rainfall	25	+.29 in.	+1.07 in.	Rainfall	25	+1.63 in.	+2.71 in.
Atmospheric pressure	25	+.053 in.	+.100 in.	Atmospheric pressure	25	—.126 in.	—.143 in.

* By registering thermometers.

Comments on Table VI are printed on page 4.

The high temperature for November and the large amount of rainfall for the year 1902 are especially noticeable.

TABLE VI.—CONTINUED.—*Meteorological conditions at stations in Michigan, in months, for the year 1902, compared with averages for corresponding months in preceding years.*

Meteorological conditions.	1902 Compared with averages for previous years.		In 1902 more (+), or less (—), than in 1901.	Meteorological conditions.	1902 Compared with averages for previous years.		In 1902 more (+), or less (—), than in 1901.
	No. of years averaged, end'g with 1901.	More (+), or less (—), in 1902 than the average for previous years.			No. of years averaged, end'g with 1901.	More (+), or less (—), in 1902 than the average for previous years.	
JULY.				AUGUST.			
Av. temp...........	25	—.04°	—4.22°	Av. temp...........	25	—2.99°	—4.38°
Range of temp *...	25	—10°	—12°	Range of temp.*...	25	—11°	—2°
Av. daily range of temp.*...........	23	—1.89°	—1.31°	Av. daily range of temp.*...........	23	—1.13°	+.50°
Cloudiness..........	25	+12 per ct.	+14 per ct.	Cloudiness..........	25	—1 per ct.	—7 per ct.
Rainfall............	25	+3.09 in.	+1.86 in.	Rainfall............	25	—1.29 in.	—1.09 in.
Atmospheric pressure..............	25	—.027 in.	—.036 in.	Atmospheric pressure..............	25	—.031 in.	—.068 in.
SEPTEMBER.				OCTOBER.			
Av. temp...........	25	—2.19°	—2.94°	Av. temp...........	25	—.34°	—1.66°
Range of temp.*...	25	—16°	—11°	Range of temp.*...	25	—15°	—9°
Av. daily range of temp.*...........	23	—2.97°	—1.90°	Av. daily range of temp..*...........	23	+.26°	—2.39°
Cloudiness..........	25	+15 per ct.	+15 per ct.	Cloudiness..........	25	+1 per ct.	+15 per ct.
Rainfall............	25	+1.40 in.	+2.02 in.	Rainfall............	25	—.52 in.	—.67 in.
Atmospheric pressure..............	25	-.081 in.	—.107 in.	Atmospheric pressure..............	25	—.027 in.	—.064 in.
NOVEMBER.				DECEMBER.			
Av. temp...........	25	+8.12	+9.33°	Av. temp...........	25	—1.28°	+2.05°
Range of temp.*...	25	—11°	=	Range of temp.*...	25	—17°	—7°
Av. daily range of temp.*...........	23	—.30°	+.48°	Av. daily range of temp.*...........	23	—1.79°	—1.59°
Cloudiness..........	25	—1 per ct.	- 3 per ct.	Cloudiness..........	25	+4 per ct.	+10 per ct.
Rainfall............	25	—.60 in.	+.93 in.	Rainfall............	25	—.18 in.	—.21 in.
Atmospheric pressure..............	25	—.046 in.	-.081 in.	Atmospheric pressure..............	25	—.010 in.	+.019 in

* By registering thermometers.

Representative data.—Whoever will carefully study Diagram I, in this article, and in similar articles for preceding years, will see that thermometers and methods of observation have become so perfect that, given a curve representing correctly the temperature by months at one station in Michigan, curves can readily be constructed without actual records, which will somewhat closely represent the temperature at each of several other stations, because the curves for many stations run so nearly parallel that all that is necessary to do is to find the average difference of mean annual temperature at the station to be represented compared with the station for which the data are given. It may also be seen that a curve representing the temperature at a station in the central part of the State very closely resembles the curve representing the average for many stations representing nearly all parts of the State. This proves that the practice adopted many years ago of using statements of some of the meteorological characteristics at one central station is a reasonably safe practice, and it is especially useful when it enables us to gain a comparison for a longer period than can be made from records at many stations, and also when employed in advance of the receipt of records from all stations, as is the case when the weekly bulletins of "Health in Michigan" are issued, for the purposes for which the meteorological conditions at the State Capitol are used to represent the conditions probably prevailing throughout the State.

That a curve exhibiting the results of the observations of *one* skillful observer, in the central part of the State, using an instrument of precision (a standard thermometer costing about three dollars), is substantially like a curve for the average of other localities, is a fact of very great importance in statistics; proving, as it does, that when great care is taken to ensure accuracy of observation, representative data are reasonably accurate and reliable; even the data collected by one observer may represent an entire State with sufficient accuracy for most practical purposes.

LOCAL METEOROLOGICAL PHENOMENA IN THE SEVERAL MONTHS OF THE YEAR 1902.

The following general remarks relative to temperature, frosts, effects on vegetation, migration of birds, etc.. in 1902, are taken from the monthly reports by observers. The names of stations are appended; the names of observers are stated in Table I:

JANUARY.

Jan. 9, trees and bushes covered with rime. Jan. 28, notable for the high barometric pressure: highest 29.88.—*Thornville.*

Depth of snow on ground, Jan. 15, one inch. Jan. 31, 1¼ inches.—*Lansing.*

Jan. 9, heavy frost on trees.—*Birmingham.*

Total snowfall, 5.4 inches. Depth of snow on ground Jan. 15, none. Jan. 31, 0.6 inches.—*Detroit.*

FEBRUARY.

Grand Traverse Bay frozen over Feb. 13.—*Traverse City.*

Feb. 16 and 26, trees and bushes covered with rime. Snow all gone except banks, Feb. 28. February was a cold winter month with sleighing till near the end. It was notable for the extremely low barometric pressure, below 28, the last day of the month.—*Thornville.*

Sleighing, Feb. 2 to 18. Depth of snow on ground Feb. 15, 3 inches. Feb. 28, none. Barometer at 9:30 A. M., Feb. 28, registered 27.99 inches, thermometer attached, 74°. Corrected for temperature, 32° Fahr., 27.876, being the lowest ever recorded at this station, since observations were begun, 1879-1902. This was followed by a high wind with a maximum of about 30 miles per hour at 2 P. M., Feb. 28.—*Lansing.*

Total snowfall, 5.4 inches.—*Detroit.*

MARCH.

March 4, trees and bushes covered with rime. March 7, robin seen. March 13, killdeer plover heard; bluebird seen. March 25, frogs heard. March was an unusually warm and pleasant month for the season; several degrees warmer than the normal. Very little high wind. No deep frost in the ground. A very good sugar time, sap runs good. Wheat, what there is of it, looks well, better than usual. A little plowing was done on the sandy lands and some oats sowed.—*Thornville.*

Ice moving in Grand River, March 1. Main channel clear, March 10. River open, March 13. Robins appeared, March 5. Blackbirds appeared, March 7. Song sparrows appeared, March 13. Lilacs budding, March 14. Frost out of ground, March 14. Soft maples in blossom, March 20. Frogs heard, March 23. Cherry trees budding, March 27. Depth of snow on ground, March 15, none. March 31, about 2 inches.—*Lansing.*

APRIL.

Total monthly snowfall, 2.7 inches.—*Alpena.*

April was a dry month and colder than usual, very favorable for work of men and teams but not for growth of vegetation. As the month closes it is remarkable to note how very full of buds all kinds of fruit trees are.—*Thornville.*

Heavy frosts, April 4, 5, 15, 20. Light frosts, April 18, 24, 27, 28. Violets in bloom, April 1. Dandelions in bloom, April 17. Cherry trees in bloom, April 26. Capitol lawn mowed, April 26. Butterfly seen, April 27.—*Lansing.*

Heavy frost, April 5. Light frosts, April 4, 20.—*Detroit.*

Heavy frost, April 9. Light frosts, April 10, 14, 15, 16.—*Sault Ste. Marie.*

MAY.

Heavy frosts, May 15, 27. Light frost, May 28.—*Marquette.*

Heavy frosts, May 1, 8, 14, 15, 28. Killing frosts, May 10, 11.—*Sault Ste. Marie.*

Light frosts, May 16, 28, 29, 31. Heavy frost, May 15. Killing frosts, May 9, 11, 14.—*Alpena.*

Light frosts, May 12, 15, 28, 29. Heavy frost, May 11.—*Port Huron.*

Frost in low grounds, May 29. Froze at night, May 26, 27, 28. Sweet cherries and pears blossom, May 3. Apples and sour cherries blossom, May 9. May was cooler than the long average, with only two days of real corn weather (over 80) and several freezing nights. There was a large rainfall, but it was dry plowing as the month closed. The wheat (what little there is) is looking the best that it has for years. There is a prospect for a good crop of apples, if nothing happens to them in the future. Some other fruits are promising too, strawberries especially. Cherries are badly stung.—*Thornville.*

Light frosts, May 1, 11, 12, 14, 15, 28. Peach and plum trees in bloom, May 3. Apple and pear trees in bloom, May 5. Red birds and orioles appeared, May 3. Bobolinks heard, May 6. May 10, commenced to snow about 6:30 A. M. and snow fell during nearly the entire forenoon, wind east; amount of snowfall estimated at from 3½ to 4 inches. Precipitation .37 of an inch. Thermometer 34° at 7:00 A. M., 38° at 2:00 P. M. and 40° at 9:00 P. M., going down to freezing point, 32° during night. Frost and ice on the morning of May 11.—*Lansing.*

Light frosts, May 1, 9, 15, 28, 29. Total snowfall 0.5 inches.—*Detroit.*

JUNE.

Light frost, June 5.—*Marquette.*

Heavy frost, June 5.—*Sault Ste. Marie.*

Light frost, June 5.—*Alpena.*

Light frost, June 9.—*Port Huron.*

June was a cloudy, wet, cold month for the season with especially cool nights, very unfavorable for farm crops, corn most of all, on account of wet soil and cold nights—bad hay weather too. Some that has been cut, spoiled. Wheat looks the best it has for years. The acreage of it is very small. We seem to have the promise of an apple crop this fall. That is encouraging. Potatoes were the latest planted I about ever knew of. A late fall, perhaps, will make that all right.—*Thornville.*

JULY.

July was a disastrously wet month, with the heaviest rain in one day, and the heaviest for the month ever recorded. Great damage done to roads and bridges from washouts and to low lying fields from floods. On many such lands, the water stood so long that the crops were entirely spoiled, such as potatoes, cabbages and onions. Much hay lies on the ground spoiled. Wheat is somewhat grown and oats lodged. The soil was so saturated with water, that the few fine days with which the month closed, could not be utilized to cut the rye, the binders miring in the field; a very discouraging time for the agricultural part of the community.

Largest rainfall in the whole 57 years that I have lived in the State—yesterday, July 2. It began at 10:00 A. M. very moderately, then held up till about 6:00 P. M., beginning moderately again, but increasing in severity till about 10:00 P. M., when it was a down pour that lasted till morning. Wooden bridges are carried off everywhere, all low grounds are inundated. There are accidents and disastrous washouts in every direction.—*Thornville.*

The most notable meteorological phenomenon during July was the large rainfall—being 7.28 inches for the month and during some of the heaviest storms which occurred on July 2, 14, 18, 24, 25 and 31, the unusually high barometer which accompanied those storms. The rainfall for July, 7.28 inches, taken in connection with that of June, 7.43 inches, making a total of 14.71 inches, is exceeded only by that of June and July, 1883, which was 20.03 inches for this station.—*Lansing.*

AUGUST.

Light frost, Aug. 12.—*Alpena.*

August was a cool month for the season—about 6° or 7° below the normal, with very cool nights. Poor corn weather. An early frost would hurt corn badly, potatoes too. The forepart of the month was a continuation of the wetness of the last two but the close is getting near a drought.—*Thornville.*

SEPTEMBER.

Light frost, Sept. 5. Heavy frosts, Sept. 12, 19, 25.—*Marquette.*

Light frost, Sept. 10. Heavy frost, Sept. 12, 19, 25.—*Sault Ste. Marie.*

Heavy frosts, Sept. 5, 14.—*Alpena.*

Light frost, Sept. 14.—*Port Huron.*

Frost in low grounds—killed tender vegetation, Sept. 14. September was a cool month (only one day in the 80's) very wet in the last half; unfavorable for work and growing crops. Corn is imperfectly ripened. Potatoes are said to be rotting. Much hay of the second growth is spoiled. Beans cannot be got dry enough to draw in and are badly damaged.—*Thornville.*

Light frost, Sept. 5. No damage. Light frost, Sept. 14, doing some damage in low lands.—*Lansing.*

Light frosts, Sept. 4, 13.—*Ann Arbor.*

Light frost, Sept. 14.—*Detroit.*

OCTOBER.

Light frosts, Oct. 1, 10. Heavy frosts, Oct. 3, 4. Killing frosts, Oct. 21.—*Marquette.*

Light frost, Oct. 1. Heavy frosts, Oct. 4, 7.—*Sault Ste. Marie.*

White frost, Oct. 3, 9, 16.—*Traverse City.*

Heavy frost, Oct. 4. Killing frost, first of season, Oct. 10.—*Alpena.*

Light frost, Oct. 8. Heavy frost, Oct. 10. Killing frost, Oct. 17.—*Port Huron.*

Frost, Oct. 8, 9. Heavy freeze, Oct. 10, 17. October was a calamitous month for farmers, between the blight and so much wet, the potatoes rotted badly and so much wet nearly ruined the bean crop.—*Thornville.*

TABLE VII.—*Depth of wells; depth of ground above water in well; temperature of water in well, and day of observation of such temperature, in each month of the year 1902, as reported by meteorological observers for the State Board of Health. (The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.)*

Stations in Michigan.	January.			February.			March.			April.			May.			June.		
	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.
Traverse City*............	55	40 6	47^{21}	55	40 7	47^{19}	55	40 6	47^{27}	55	40	47^{26}	55	40	47^{21}	55	40 5	47^{27}
Lansing....................	26 11½	26 8	46^{16}	†	....	......	26 11½	26 7⅝	45^{17}	26 11½	26 5	50^{15}	26 11½	26 3⅛	50^{15}	26 11½	25 10	50^{14}
Ann Arbor................	14 10	11 8	41^{17}	14 10	12 6	61^{16}	14 10	12 1	58^{19}	14 10	11 6	58^{17}	14 10	11 1	54^{20}	14 10	8 10	54^{19}

Stations in Michigan.	July.			August.			September.			October.			November.			December.		
	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well.—Ft., in.	Depth of ground above water in well.—Ft., in.	Temp. of water in well.—Deg. Fahr.
Traverse City*............	55	40	48^{28}	....	....	......	55	40 7	48^{27}	55	40 7	48^{3}	55	40 10	47^{5}	55	41 6	47^{18}
Lansing....................	26 11½	25 8	51^{16}	26 11½	25 4	51^{16}	26 11½	25 7	51^{15}	26 11½	25 5	52^{16}	16 11½	25 5½	52^{15}	26 11½	25 5	52^{17}
Ann Arbor................	14 10	8 8	57^{16}	16 10	10 3	55^{18}	16 10	11 8	54^{18}	14 10	11 6	56^{18}	14 10	10 1	53^{18}	14 10	11 2	41^{19}

* At Northern Michigan Asylum, Alfred Newman, observer.

† Well dry.

NOTE.—The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.

Light frosts, Oct. 8, 16. Killing frosts, Oct. 10 (first of season), 17, 20, 21, 28, 29, 31. Snow, first of season, Oct. 14, 7:00 A. M. Ground froze (first of season) Oct. 21, 29. Ice formed (first of season) Oct. 21, 29. Total eclipse of moon, Oct. 16 and 17.—*Lansing.*

Light frosts, Oct. 8, 10, 17. Heavy frost, Oct. 20. Killing frost, Oct. 21.—*Detroit.*

NOVEMBER.

The warmest November on record at Alpena.—*Alpena.*

November was a nice autumn month, very favorable for all kinds of work, much pleasant weather, good roads. Wheat and rye go into winter quarters looking well.—*Thornville.*

Wild geese flying south, Nov. 5. Picked dandelion blossom, Nov. 7, 9, 12, 19, 21. Sweet peas in blossom, Nov. 12, 21. Depth of snow on ground. Nov. 30, a little in patches.—*Lansing.*

DECEMBER.

December was a fair winter month, rough and blustering toward the last but no zero weather; no good sleighing. As the month closes there is enough snow on the ground for a very good protection for the crops which are in excellent condition.—*Thornville.*

Ice formed in Grand River (first of season), Dec. 8. Grand River closed, Dec. 12. Open, Dec. 22. Closed second time, Dec. 26. Sleighing (first of season), Dec. 25, 26, 27, 28, 29, 30, 31. Depth of snow on ground, Dec. 15, none. Dec. 31, 5 inches.—*Lansing.*

Temperature of the atmosphere.—The average temperature by months, for the twenty-three years, 1879-1901, at Lansing, and a comparison of 1902, by months, with that average, are stated in Table XI.

The average temperatures at each of six stations in Michigan, and the average for the six stations in 1902, and in each month of that year, are stated in Table IX.

TABLE VIII.—*Average temperature by year and months in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 yrs., 1877-1901	46.51	21.98	22.77	29.89	45.11	56.43	66.64	71.13	68.61	61.73	49.88	36.30	27.69
Av. 23 yrs.. 1879-1901	46.30	21.88	22.05	29.56	44.73	56.42	66.66	70.93	68.43	61.54	49.74	36.15	27.51
1901 (8 stations)....	46.72	24.11	16.66	31.81	46.34	55.28	67.96	75.31	70.00	62.48	51.20	35.09	24.36
1902 (6 stations)....	46.80	22.93	21.11	37.45	44.95	57.05	61.53	71.09	65.62	59.54	49.54	44.42	26.41
In 1902 **higher** than av. for 25 years, 1877-1901..........	.29	.95	......	7.56	......	.63	......	......	......	......	......	8.12	......
In 1902 **lower** than av. for 25 years, 1877-1901.........	....	......	1.66	......	.16	......	5.11	.04	2.99	2.19	.34	......	1.28
In 1902 **higher** than in 1901............	.08	......	4.45	5.64	......	1.78	......	......	......	......	......	9.33	2.05
In 1902 **lower** than in 1901............	....	1.18	......	......	1.39	......	6.43	4.22	4.38	2.94	1.66	......	......

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* At from 9 to 22 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 17, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Table VIII, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

The average annual and monthly temperatures at from eight to twenty-two stations for a period of twenty-five years, 1877-1901, are stated in Table VIII, in which is also given, by months, a comparison of 1902 with the average for 1901, and with the averages for the twenty-five years, 1877-1901. By Table VIII, which gives averages for groups of several stations in Michigan, it appears that in 1902 t[illegible] temperature in

January, April, June, July, August, September and October was lower than in those months in 1901. It also appears that January, March, May and November were warmer than the average temperature for the corresponding months for the twenty-five years, 1877-1901.

TABLE IX.—*Average temperature in degrees Fahr., for the year, and by months of the year 1902, at each of 7 stations in Michigan, and also an average line for the 6 stations. From observations made daily at 7 A. M., 2 P. M., and 9 P. M., local time, by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Temperature in degrees Fahr.													
		Year.		Months, ‡ 1902.											
		Norm. §	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average, 6 stations ¶	....	......	46.80	22.93	21.11	37.45	44.95	57.06	61.53	71.09	65.62	59.54	49.54	44.42	26.41
Traverse City........	N. W.	44.46^{20}	41.16	24.19	22.12	^{a}35.52	43.06	^{c}54.30	59.13	70.16	^{d}67.00	59.96	48.03	^{b}43.48	^{c}26.98
Harrisville............	N. E.	43.12^{14}	43.62	20.68	19.46	34.06	41.61	49.48	56.49	66.61	62.75	57.59	47.15	42.59	24.92
Thornville............	B. & E.	47.96^{26}	47.68	23.25	21.67	38.56	46.32	59.23	62.69	72.10	65.88	60.06	50.37	44.87	27.13
Agr'l College........	C.	46.71^{39}	47.24	22.09	19.52	38.37	45.80	60.19	63.78	72.62	64.75	59.38	49.98	44.12	26.28
Lansing, S. B. of H.‖	C.	47.50^{24}	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02
Ann Arbor...........	S. C.	47.31^{22}	47.94	23.40	21.80	39.20	46.33	59.20	63.20	72.90	66.90	60.00	50.70	45.60	26.10
Birmingham..........	S. E.	......	**	^{a}22.32	20.86	38.33	46.87	.....	63.26	73.56	.....	.....	.....	.....	.....

* The names of observers, their place of observation, and the counties in which these places are situated, are stated in Table I.

† The names of divisions, and the counties in each, are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ The computations for average temperature, as tabulated for months in 1902, were made at the following stations: Ann Arbor and the Agricultural College. All other computations in Table IX were made at the office of the State Board of Health.

§ Numbers in this column state the average annual temperature for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the temperature, denote the number of years included in the average.

¶ This line is an average for the six stations from which statements nearly complete were received for every month of the year. It does not include Birmingham.

‖ Beginning with the year, 1885, allowance must be made for Lansing in Table IX, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

** The average for 6 months is 44.20.

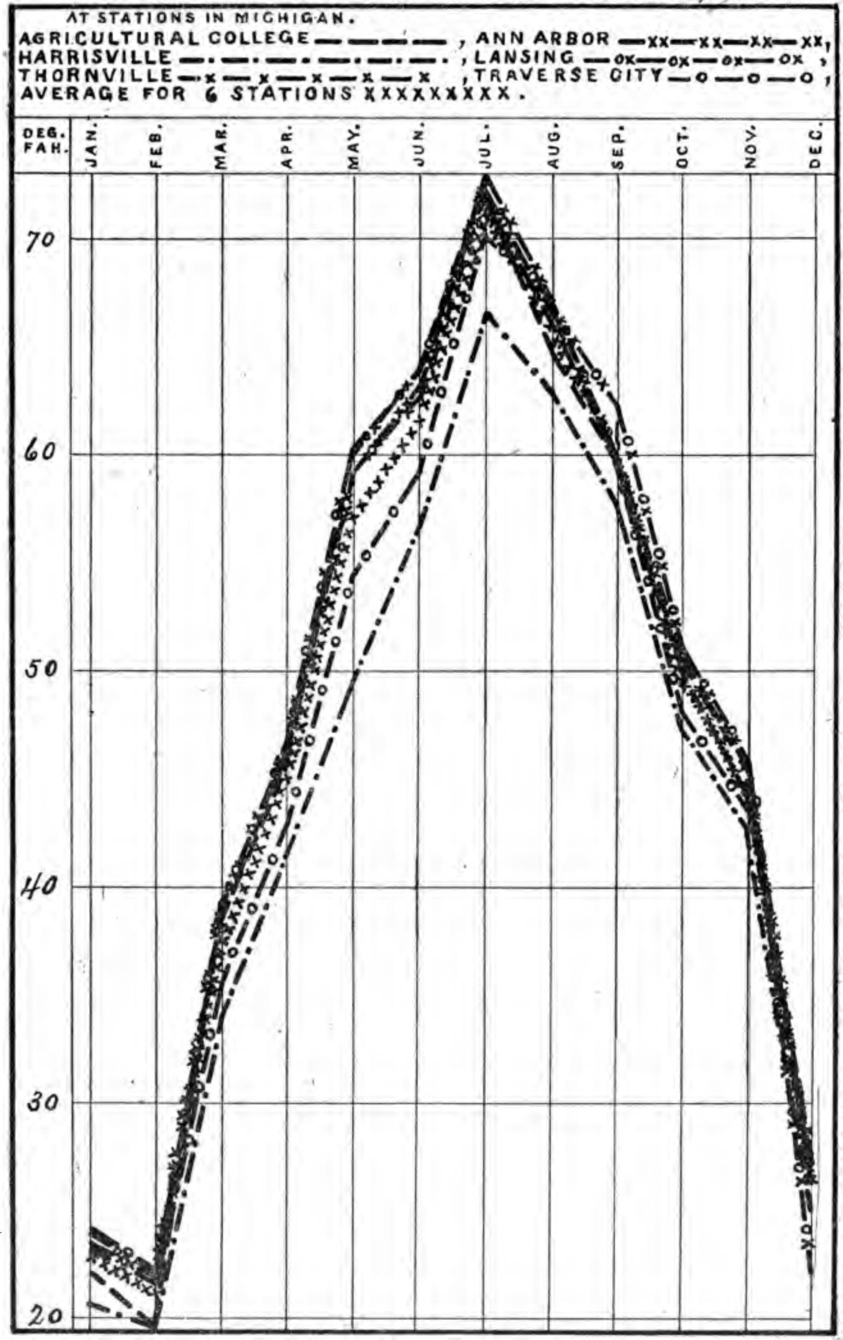
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 16 days.

The average line and lines for six representative stations in Table IX are graphically represented in Diagram I.

The average daily range of temperature at from 6 to 19 stations per year, by months, for a period of twenty-three years, 1879-1901, and a comparison of 1902 with the monthly averages for that period and for 1901, are given in Table XIII. The highest and lowest temperatures in every month in 1902, at each of eleven stations, are stated in Table XIV. The average daily range of temperature by months in 1902, at each of thirteen stations, and the average for twelve stations, are stated in Table XV. The lines for each of these stations, and the average line for the twelve stations. are represented in Diagram II. It will be noticed that the greatest *average* daily range of the twelve stations occurred during the months of May, June, July and August, but there were wide differences in the several stations.

DIAGRAM I.—AVERAGE TEMPERATURE BY MONTHS, 1902.



[PLATE 1164]

TABLE X.—*Comparison of the average temperature during the year and during each month of the year 1902, with the annual and with the monthly averages for the year 1901, and with the averages for the 38 years, 1864-1901. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 38 yrs., 1864-1901	46.70	22.14	23.14	30.87	46.22	58.06	67.90	71.53	69.01	60.80	48.71	35.59	26.57
1901................	46.90	23.45	14.38	32.49	47.78	57.42	69.04	76.32	69.29	62.67	51.13	34.53	24.25
1902................	47.24	22.09	19.52	38.37	45.80	60.19	63.78	72.62	64.75	59.38	49.98	44.12	26.28
In 1902 **higher** than av. for 38 years, 1864-1901..........	.54	......	......	7.50	......	2.13	......	1.09	......	......	1.27	8.53	......
In 1902 **lower** than av. for 38 years, 1864-1901..........	....	.05	3.62	......	.42	......	4.12	......	4.26	1.42	......	......	.29
In 1902 **higher** than in 1901............	.34	......	5.14	5.88	......	2.77	......	......	......	......	......	9.59	2.08
In 1902 **lower** than in 1901............	....	1.36	......	......	1.98	......	5.26	3.70	4.54	3.29	1.15	......	......

TABLE XI.—*Average temperature by year and months in 1902* compared with annual and monthly averages for 1901, and for the 23 years, 1879-1901. Observations made at office State Board of Health, State Capitol, Lansing, Mich.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 yrs., 1879-1901	47.47	22.84	23.34	31.25	46.73	58.25	68.31	72.24	69.13	62.01	50.45	36.83	28.23
1901................	47.08	24.45	16.06	32.08	47.37	56.45	69.57	76.00	69.53	62.02	51.38	35.40	24.67
1902................	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02
In 1902 **higher** than av. for 23 years, 1879-1901..........	.72	1.10	......	7.73	......	1.73	......	......	......	......	.58	9.01	......
In 1902 **lower** than av. for 23 years, 1879-1901..........	....	......	1.23	......	.13	......	4.41	.07	2.71	1.74	......	......	1.21
In 1902 **higher** than in 1901............	1.11	......	6.05	6.90	......	3.53	......	......	......	......	......	10.44	2.35
In 1902 **lower** than in 1901............	....	.51	......	......	.77	......	5.67	3.83	3.11	1.75	.35	......	......

*** Beginning with the year 1885, slight allowance should be made for Lansing in Exhibit 10, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.**

TABLE XII.—*Average temperature in degrees Fahr., for the year and months, 1902, at office State Board of Health, State Capitol, Lansing, Michigan, computed from readings at 7 A. M., 2 P. M., and 9 P. M., daily, from registers of the Draper self-recording thermometer, compared with observations made with Green's standard mercurial thermometer at the same hours; both thermometers placed in latticed shelter for instruments, in the southwest part of the Capitol yard.*

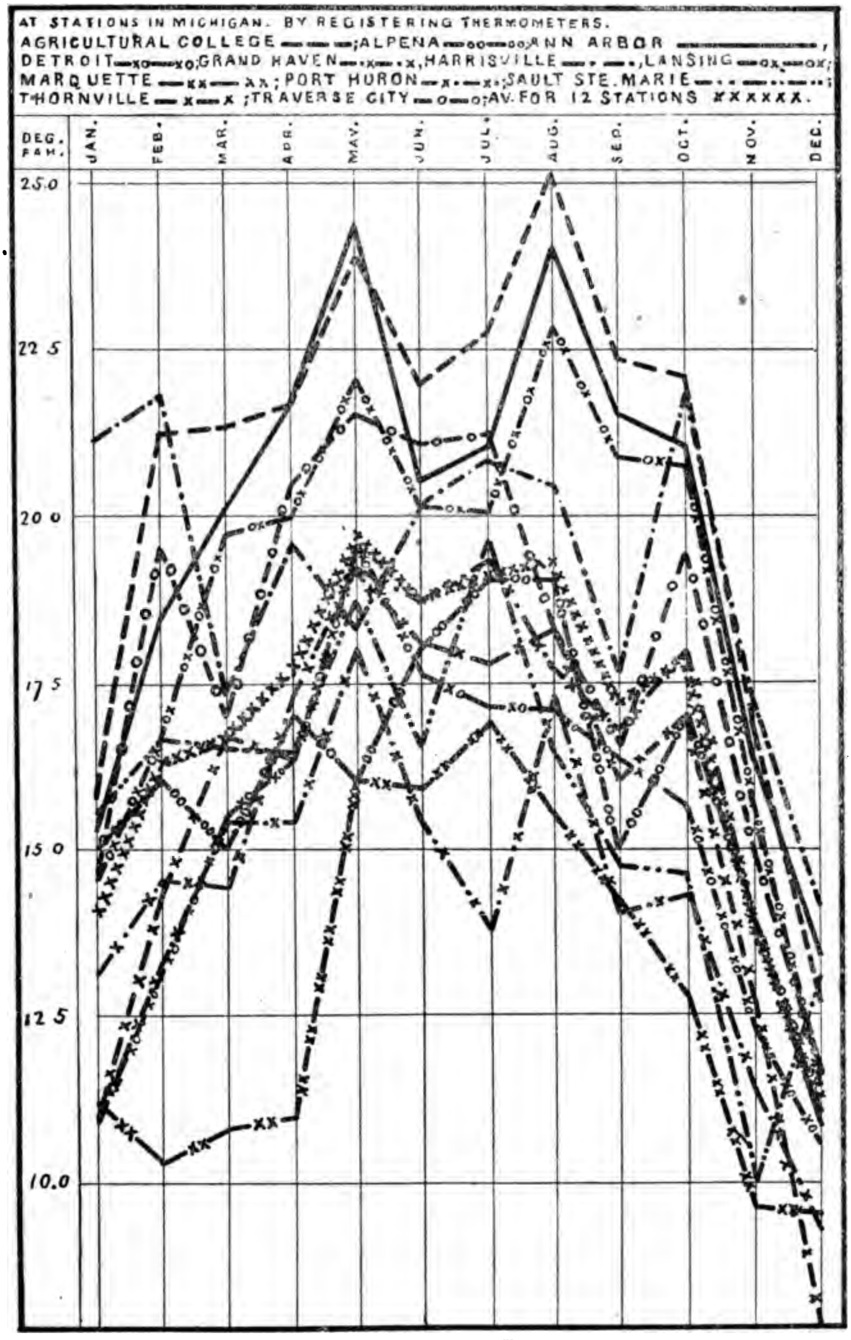
Tri-daily readings of instruments specified.	Year.	Average temperature, in degrees Fahr. Year and months, 1902.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. temp. from tri-daily observations with Green's standard mercurial thermometer...........	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02
Av. temp. computed from readings of the Draper's self-recording thermometer..............	46.94	24.03	22.55	38.57	46.10	58.33	62.08	69.60	63.74	57.99	49.40	44.52	26.39
Higher by Draper's than by Green's thermometer......	......	.09	.44	......	......	......	......	......	......	......	......	......	......
Lower by Draper's than by Green's thermometer......	1.25	......	......	.41	.50	1.65	1.82	2.57	2.68	2.28	1.63	1.32	.63

TABLE XIII.—*Average daily range of temperature, by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 23 years, 1879-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average daily range of temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 yrs., 1879-1901	17.97	15.24	16.80	17.19	19.07	20.23	20.82	21.00	20.45	20.13	17.59	14.03	13.07
1901 (14 stations)...	17.30	14.00	16.32	15.73	18.00	18.63	20.24	20.42	18.82	19.06	20.24	13.25	12.87
1902 (12 stations)...	16.80	14.07	16.30	16.63	17.75	19.70	18.65	19.11	19.32	17.16	17.85	13.73	11.28
In 1902 **greater** than av. for 23 years, 1879-1901..	....	......	......	......	......	......	......	......	......	......	.26	......	......
In 1902 **less** than av. for 23 years, 1879-1901..........	1.17	1.17	.50	.56	1.32	.53	2.17	1.89	1.13	2.97	......	.30	1.79
In 1902 **greater** than in 1901......	....	.07	......	.90	......	1.07	......	......	.50	......	......	.48	......
In 1902 **less** than in 1901............	.50	......	.02	......	.25	......	1.59	1.31	......	1.90	2.39	......	1.59

*** At from 6 to 19 stations per year for the 23 years, 1879-1901. Just which stations in each year, up to 1897, are shown on page 21, report for 1898.**

DIAGRAM II.--AV. DAILY RANGE OF TEMPERATURE BY MONTHS, 1902.



[PLATE 1163]

TABLE XIV.—*Extremes of temperature and days of month on which the highest and range for the year 1902, at each of 12 stations in Michigan, as indicated by A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health, and for*

Line number.	Stations in Michigan.* (Those of the U. S. Weather Bureau in italics.)	Year 1902.			January.		February.		March.		April.		May.	
		Highest.	Lowest.	Range.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1	At 11 stations†	94	—14	108	44	—14	57	—10	70	—6	84	13	90	21
2	*Marquette*§	90	—14	104	37^{7}	-14^{28}	45^{26}	-6^{5}	60^{27}	3^{17}	72^{28}	16^{7}	90^{22}	27^{9}
3	*Sault Ste. Marie*§	84	—10	94	36^{8}	-9^{19}	44^{27}	-10^{14}	54^{27}	-6^{18}	73^{22}	13^{7}	79^{23}	30^{11}
4	Traverse City‡	92	—7	99	$38^{7,8,9}$	$-5^{27,28}$	52^{27}	-7^{18}	65^{26}	7^{18}	84^{22}	21^{6}	82^{19}	29^{10}
5	*Alpena*§	92	—8	100	37^{2}	-8^{28}	49^{23}	-2^{19}	69^{27}	1^{18}	83^{22}	21^{7}	81^{22}	27^{11}
6	Harrisville‡	94	—11	105	44^{8}	-11^{27}	50^{24}	-5^{4}	70^{27}	0^{17}	82^{22}	$23^{3,7}$	89^{22}	21^{10}
7	*Grand Haven*§	85	0	85	$41^{8,9}$	0^{28}	$46^{25,27}$	0^{14}	64^{10}	7^{17}	72^{21}	23^{7}	84^{19}	31^{10}
8	*Port Huron*§	90	—4	94	39^{8}	-3^{28}	57^{28}	-4^{5}	68^{27}	9^{18}	80^{22}	27^{5}	85^{22}	33^{1}
9	Thornville‡	88	—3	91	40^{9}	-3^{28}	51^{28}	-2^{5}	66^{27}	9^{18}	81^{22}	25^{4}	87^{22}	33^{1}
10	Lansing, S. B. of H.‡¶	90	—5	95	41^{9}	-4^{27}	52^{28}	-5^{5}	69^{27}	5^{17}	82^{22}	24^{14}	88^{19}	$32^{10,14}$
11	Ann Arbor‖	91	—7	98	41^{9}	-4^{28}	54^{28}	-7^{5}	69^{27}	8^{18}	83^{22}	23^{15}	90^{19}	31^{11}
12	Birmingham‡	......	......	......	42^{10}	-7^{28}	50^{28}	$-7^{4,5}$	69^{27}	$8^{17,18}$	85^{23}	24^{3}	......	......
13	*Detroit*§	91	—4	95	40^{2}	0^{28}	54^{28}	-4^{5}	64^{27}	10^{18}	81^{22}	28^{8}	87^{19}	34^{10}

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* The names of observers, etc., are stated in Table I.

† The line No. 1, and the three columns for the year 1902, relate only to the eleven stations from which observations were received for every month of the year. It does not include Birmingham.

‡ For stations marked thus ‡, the daily readings of registering thermometers were recorded at 7 A. M. for the preceding calendar day.

§ At the stations of the U. S. Weather Bureau, the maximum thermometer was read and recorded at 8:00 A. M., and the minimum at 8:00 P. M., 75th Meridian time. The local time at these stations corresponding to 8:00 A. M. and 8:00 P. M., 75th Meridian time, is as follows: At Port Huron, 7:30 A. M. and 7:30 P. M.; at Detroit, 7:28 A. M. and 7:28 P. M.; at Alpena, 7:26 A. M. and 7:26 P. M.; at Grand Haven, 7:15 A. M. and 7:15 P. M.; at Marquette, 7:11 A. M. and 7:11 P. M.; at Sault Ste Marie, 7:23 A. M. and 7:23 P. M.

‖ At Ann Arbor, the registering thermometers were read at 9 P. M.

¶ Beginning with the year 1885 allowance must be made for Lansing in Table XIV, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit B, on page 22, report for 1886.

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperature, state the day or days of the month on which the highest or lowest temperature occurred.

and the lowest temperature occurred by months of the year 1902; also, extremes daily readings of registering thermometers, or by observations made daily at 7 the United States Weather Bureau.*

June.		July.		August.		September.		October.		November.		December.		Line number.
Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	
88	35	94	45	89	41	85	36	75	25	70	14	47	—5	1
78^{15}	35^{5}	90^{7}	50^{3}	87^{2}	45^{9}	75^{14}	39^{12}	70^{4}	32^{21}	58^{4}	14^{30}	42^{11}	4^{9}	2
75^{2}	36^{5}	84^{6}	45^{16}	81^{2}	43^{12}	76^{17}	36^{12}	63^{6}	26^{29}	58^{2}	15^{28}	42^{19}	-5^{26}	3
88^{21}	39^{4}	92^{4}	46^{9}	$84^{2,29}$	45^{11}	80^{17}	40^{13}	69^{26}	27^{16}	68^{2}	25^{29}	$44^{1,2}$	2^{13}	4
79^{2}	39^{5}	92^{6}	47^{16}	84^{31}	42^{12}	78^{8}	37^{14}	71^{6}	25^{17}	67^{13}	17^{28}	42^{19}	2^{14}	5
87^{2}	40^{10}	94^{5}	$48^{10,15}$	$85^{26,31}$	41^{11}	79^{2}	37^{4}	73^{24}	$27^{16,20}$	68^{13}	16^{27}	47^{2}	6^{8}	6
$82^{12,14}$	45^{5}	85^{3}	52^{1}	$80^{1,9,30}$	46^{23}	79^{17}	$40^{13,14}$	67^{28}	32^{17}	65^{14}	$27^{26,27}$	46^{1}	10^{14}	7
83^{2}	41^{9}	90^{6}	46^{1}	84^{31}	48^{12}	81^{1}	37^{14}	75^{26}	31^{29}	68^{12}	19^{28}	47^{21}	5^{14}	8
$85^{2,15}$	$43^{9,23}$	$88^{4,7,28}$	47^{1}	82^{2}	$47^{12,23}$	81^{8}	40^{14}	73^{26}	30^{17}	70^{13}	20^{28}	46^{21}	6^{27}	9
88^{15}	$41^{22,25}$	90^{4}	49^{10}	89^{30}	44^{11}	84^{1}	38^{13}	74^{24}	$28^{20,28}$	$69^{1,18}$	$20^{27,28}$	46^{1}	2^{26}	10
87^{15}	42^{28}	91^{4}	47^{1}	88^{30}	44^{12}	85^{22}	36^{14}	75^{24}	31^{22}	70^{2}	18^{28}	$44^{1,21}$	2^{27}	11
$85^{2,15}$	39^{8}	$90^{6,8}$	48^{10}	......	....	......	....	......	....	......	....	......	....	12
8^{15}	46^{9}	91^{4}	49^{1}	86^{3}	51^{8}	83^{1}	40^{14}	75^{26}	31^{29}	69^{12}	22^{28}	46^{21}	8^{31}	13

Light frosts, Oct. 8, 16. Killing frosts, Oct. 10 (first of season), 17, 20, 21, 28, 29, 31. Snow, first of season, Oct. 14, 7:00 A. M. Ground froze (first of season) Oct. 21, 29. Ice formed (first of season) Oct. 21, 29. Total eclipse of moon, Oct. 16 and 17.—*Lansing.*

Light frosts, Oct. 8, 10, 17. Heavy frost, Oct. 20. Killing frost, Oct. 21.—*Detroit.*

NOVEMBER.

The warmest November on record at Alpena.—*Alpena.*

November was a nice autumn month, very favorable for all kinds of work, much pleasant weather, good roads. Wheat and rye go into winter quarters looking well.—*Thornville.*

Wild geese flying south, Nov. 5. Picked dandelion blossom, Nov. 7, 9, 12, 19, 21. Sweet peas in blossom, Nov. 12, 21. Depth of snow on ground. Nov. 30, a little in patches.—*Lansing.*

DECEMBER.

December was a fair winter month, rough and blustering toward the last but no zero weather; no good sleighing. As the month closes there is enough snow on the ground for a very good protection for the crops which are in excellent condition.—*Thornville.*

Ice formed in Grand River (first of season), Dec. 8. Grand River closed, Dec. 12. Open, Dec. 22. Closed second time, Dec. 26. Sleighing (first of season), Dec. 25, 26, 27, 28, 29, 30, 31. Depth of snow on ground, Dec. 15, none. Dec. 31, 5 inches.—*Lansing.*

Temperature of the atmosphere.—The average temperature by months, for the twenty-three years, 1879-1901, at Lansing, and a comparison of 1902, by months, with that average, are stated in Table XI.

The average temperatures at each of six stations in Michigan, and the average for the six stations in 1902, and in each month of that year, are stated in Table IX.

TABLE VIII.—*Average temperature by year and months in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 yrs., 1877-1901	46.51	21.98	22.77	29.89	45.11	56.43	66.64	71.13	68.61	61.73	49.88	36.30	27.69
Av. 23 yrs.. 1879-1901	46.30	21.88	22.05	29.56	44.73	56.42	66.66	70.93	68.43	61.54	49.74	36.15	27.51
1901 (8 stations)....	46.72	24.11	16.66	31.81	46.34	55.28	67.96	75.31	70.00	62.48	51.20	35.09	24.36
1902 (6 stations)....	46.80	22.93	21.11	37.45	44.95	57.06	61.53	71.09	65.62	59.54	49.54	44.42	26.41
In 1902 **higher** than av. for 25 years, 1877-1901..........	.29	.95	......	7.56	......	.63	......	......	......	......	......	8.12	......
In 1902 **lower** than av. for 25 years, 1877-1901..........	....	......	1.66	......	.16	......	5.11	.04	2.99	2.19	.34	......	1.28
In 1902 **higher** than in 1901............	.08	......	4.45	5.64	......	1.78	......	......	......	......	......	9.33	2.05
In 1902 **lower** than in 1901............	....	1.18	......	......	1.39	......	6.43	4.22	4.38	2.94	1.66	......	......

* At from 9 to 22 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 17, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Table VIII, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

The average annual and monthly temperatures at from eight to twenty-two stations for a period of twenty-five years, 1877-1901, are stated in Table VIII, in which is also given, by months, a comparison of 1902 with the average for 1901, and with the averages for the twenty-five years, 1877-1901. By Table VIII, which gives averages for groups of several stations in Michigan, it appears that in 1902 the mean temperature in

January, April, June, July, August, September and October was lower than in those months in 1901. It also appears that January, March, May and November were warmer than the average temperature for the corresponding months for the twenty-five years, 1877-1901.

TABLE IX.—*Average temperature in degrees Fahr., for the year, and by months of the year 1902, at each of 7 stations in Michigan, and also an average line for the 6 stations. From observations made daily at 7 A. M., 2 P. M., and 9 P. M., local time, by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Temperature in degrees Fahr.													
		Year.		Months, ‡ 1902.											
		Norm. §	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average, 6 stations¶	....	......	46.80	22.93	21.11	37.45	44.95	57.06	61.53	71.09	65.62	59.54	49.54	44.42	26.41
Traverse City........	N. W.	44.46^{20}	41.16	24.19	22.12	[a] 35.52	43.06	[c] 54.30	59.13	70.16	[d] 67.00	59.96	48.03	[b] 43.48	[c] 26.98
Harrisville............	N. E.	43.12^{14}	43.62	20.68	19.46	34.06	41.61	49.48	56.49	66.61	62.75	57.59	47.15	42.59	24.92
Thornville............	B. & E.	47.96^{26}	47.68	23.25	21.67	38.56	46.32	59.23	62.69	72.10	65.88	60.06	50.37	44.87	27.13
Agr'l College........	C.	46.71^{39}	47.24	22.09	19.52	38.37	45.80	60.19	63.78	72.62	64.75	59.38	49.98	44.12	26.28
Lansing, S. B. of H.‖	C.	47.50^{24}	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02
Ann Arbor...........	S. C.	47.31^{22}	47.94	23.40	21.80	39.20	46.33	59.20	63.20	72.90	66.90	60.00	50.70	45.60	26.10
Birmingham..........	S. E.	......	**	[a] 22.32	20.86	38.33	46.87	.....	63.26	73.56	.....	.....	.....	.....	.....

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* The names of observers, their place of observation, and the counties in which these places are situated, are stated in Table I.

† The names of divisions, and the counties in each, are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ The computations for average temperature, as tabulated for months in 1902, were made at the following stations: Ann Arbor and the Agricultural College. All other computations in Table IX were made at the office of the State Board of Health.

§ Numbers in this column state the average annual temperature for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the temperature, denote the number of years included in the average.

¶ This line is an average for the six stations from which statements nearly complete were received for every month of the year. It does not include Birmingham.

‖ Beginning with the year, 1885, allowance must be made for Lansing in Table IX, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

** The average for 6 months is 44.20.

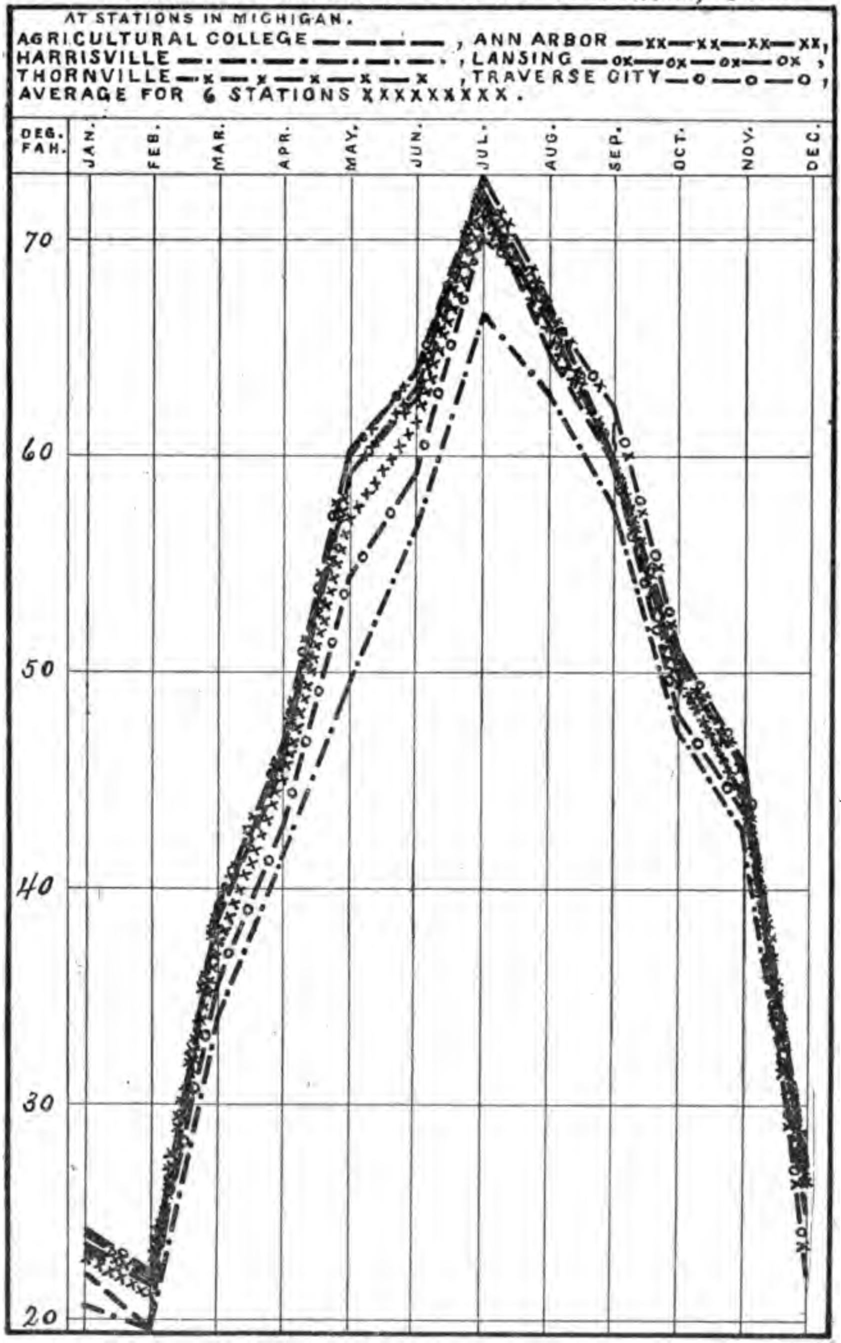
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 16 days.

The average line and lines for six representative stations in Table IX are graphically represented in Diagram I.

The average daily range of temperature at from 6 to 19 stations per year, by months, for a period of twenty-three years, 1879-1901, and a comparison of 1902 with the monthly averages for that period and for 1901, are given in Table XIII. The highest and lowest temperatures in every month in 1902, at each of eleven stations, are stated in Table XIV. The average daily range of temperature by months in 1902, at each of thirteen stations, and the average for twelve stations, are stated in Table XV. The lines for each of these stations, and the average line for the twelve stations. are represented in Diagram II. It will be noticed that the greatest *average* daily range of the twelve stations occurred during the months of May, June, July and August, but there were wide differences in the several stations.

DIAGRAM I.—AVERAGE TEMPERATURE BY MONTHS, 1902.



[PLATE 1164]

TABLE X.—*Comparison of the average temperature during the year and during each month of the year 1902, with the annual and with the monthly averages for the year 1901, and with the averages for the 38 years, 1864-1901. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 38 yrs., 1864-1901	46.70	22.14	23.14	30.87	46.22	58.06	67.90	71.53	69.01	60.80	48.71	35.59	26.57
1901	46.90	23.45	14.38	32.49	47.78	57.42	69.04	76.32	69.29	62.67	51.13	34.53	24.25
1902	47.24	22.09	19.52	38.37	45.80	60.19	63.78	72.62	64.75	59.38	49.98	44.12	26.28
In 1902 **higher** than av. for 38 years, 1864-1901	.54			7.50		2.13		1.09			1.27	8.53	
In 1902 **lower** than av. for 38 years, 1864-1901		.05	3.62		.42		4.12		4.26	1.42			.29
In 1902 **higher** than in 1901	.34		5.14	5.88		2.77						9.59	2.03
In 1902 **lower** than in 1901		1.36			1.98		5.26	3.70	4.54	3.29	1.15		

TABLE XI.—*Average temperature by year and months in 1902* compared with annual and monthly averages for 1901, and for the 23 years, 1879-1901. Observations made at office State Board of Health, State Capitol, Lansing, Mich.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 yrs., 1879-1901	47.47	22.84	23.34	31.25	46.73	58.25	68.31	72.24	69.13	62.01	50.45	36.83	28.23
1901	47.08	24.45	16.06	32.08	47.37	56.45	69.57	76.00	69.53	62.02	51.38	35.40	24.67
1902	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02
In 1902 **higher** than av. for 23 years, 1879-1901	.72	1.10		7.73		1.73					.58	9.01	
In 1902 **lower** than av. for 23 years, 1879-1901			1.23		.13		4.41	.07	2.71	1.74			1.21
In 1902 **higher** than in 1901	1.11		6.05	6.90		3.53						10.44	2.35
In 1902 **lower** than in 1901		.51			.77		5.67	3.83	3.11	1.75	.35		

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* Beginning with the year 1885, slight allowance should be made for Lansing in Exhibit 10, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

TABLE XII.—*Average temperature in degrees Fahr., for the year and months, 1902, at office State Board of Health, State Capitol, Lansing, Michigan, computed from readings at 7 A. M., 2 P. M., and 9 P. M., daily, from registers of the Draper self-recording thermometer, compared with observations made with Green's standard mercurial thermometer at the same hours; both thermometers placed in latticed shelter for instruments, in the southwest part of the Capitol yard.*

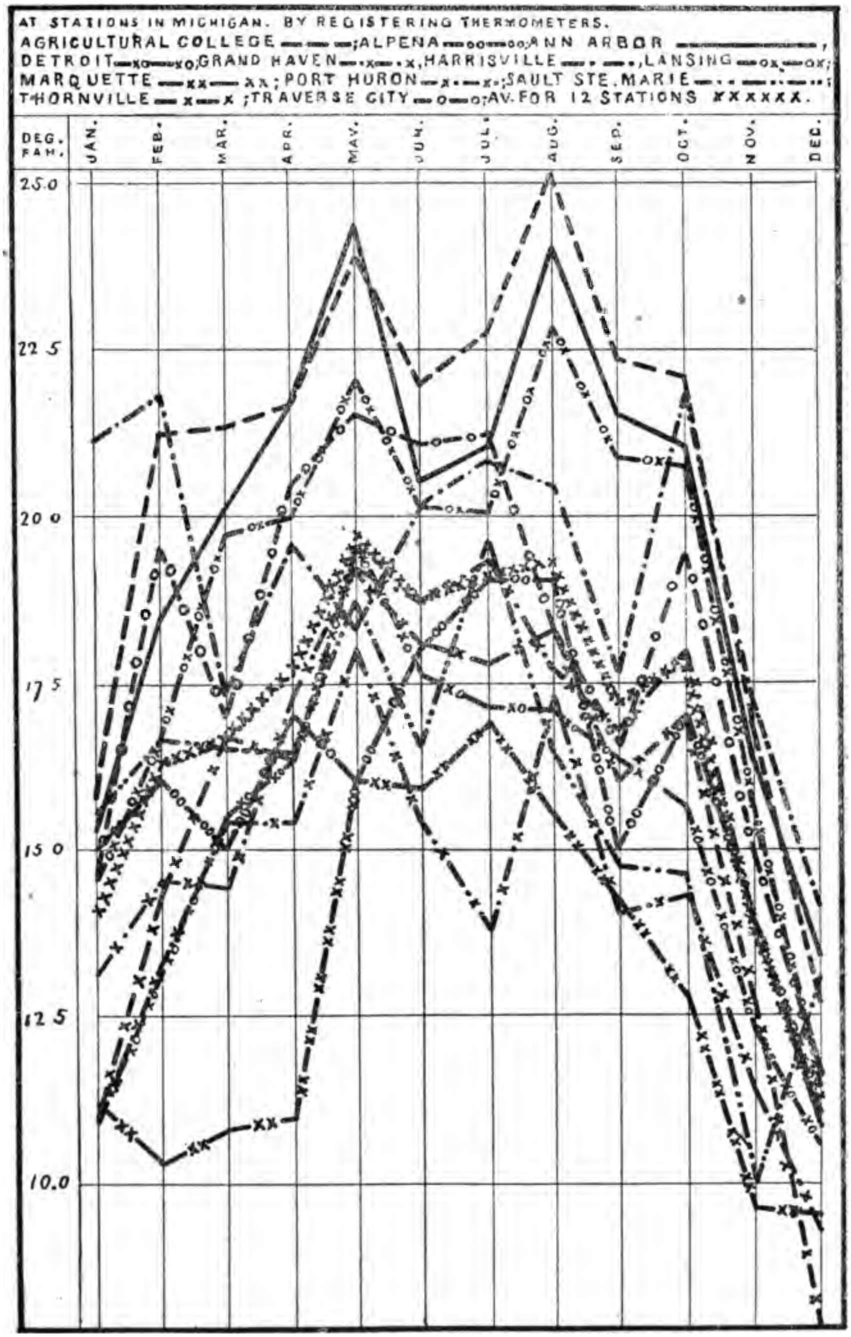
Tri-daily readings of instruments specified.	Year.	Average temperature, in degrees Fahr. Year and months, 1902.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. temp. from tri-daily observations with Green's standard mercurial thermometer...........	48.19	23.94	22.11	38.98	46.60	59.98	63.90	72.17	66.42	60.27	51.03	45.84	27.02
Av. temp. computed from readings of the Draper's self-recording thermometer..............	46.94	24.03	22.55	38.57	46.10	58.33	62.08	69.60	63.74	57.99	49.40	44.52	26.39
Higher by Draper's than by Green's thermometer......	......	.09	.44	......	......	......	......	......	......	......	......	......	......
Lower by Draper's than by Green's thermometer......	1.25	......	......	.41	.50	1.65	1.82	2.57	2.68	2.28	1.63	1.32	.63

TABLE XIII.—*Average daily range of temperature, by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 23 years, 1879-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average daily range of temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 yrs., 1879-1901	17.97	15.24	16.80	17.19	19.07	20.23	20.82	21.00	20.45	20.13	17.59	14.03	13.07
1901 (14 stations)...	17.30	14.00	16.32	15.73	18.00	18.63	20.24	20.42	18.82	19.06	20.24	13.25	12.87
1902 (12 stations)...	16.80	14.07	16.30	16.63	17.75	19.70	18.65	19.11	19.32	17.16	17.85	13.73	11.28
In 1902 **greater** than av. for 23 years, 1879-1901..	....	......	......	......	......	......	......	......	......	......	.26	......	......
In 1902 **less** than av. for 23 years, 1879-1901..........	1.17	1.17	.50	.56	1.32	.53	2.17	1.89	1.13	2.97	......	.30	1.79
In 1902 **greater** than in 1901......	....	.07	......	.90	......	1.07	......	......	.50	......	......	.48	......
In 1902 **less** than in 1901............	.50	......	.02	......	.25	......	1.59	1.31	......	1.90	2.39	......	1.59

* At from 6 to 19 stations per year for the 23 years, 1879-1901. Just which stations in each year, up to 1897, are shown on page 21, report for 1898.

DIAGRAM II.—AV. DAILY RANGE OF TEMPERATURE BY MONTHS, 1902.



[PLATE 1163]

TABLE XIV.—*Extremes of temperature and days of month on which the highest and range for the year 1902, at each of 12 stations in Michigan, as indicated by A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health, and for*

Line number.	Stations in Michigan.* (Those of the U. S. Weather Bureau in italics.)	Year 1902.			January.		February.		March.		April.		May.	
		Highest.	Lowest.	Range.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1	At 11 stations† ..	94	—14	108	44	—14	57	—10	70	—6	84	13	90	21
2	*Marquette*§........	90	—14	104	37^{7}	-14^{28}	45^{26}	-6^{5}	60^{27}	3^{17}	72^{28}	16^{7}	90^{22}	27^{9}
3	*Sault Ste Marie*§.	84	—10	94	36^{8}	-9^{19}	44^{27}	-10^{14}	54^{27}	-6^{18}	73^{22}	13^{7}	79^{23}	30^{11}
4	Traverse City‡...	92	—7	99	$38^{7,8,9}$	$-5^{27,28}$	52^{27}	-7^{18}	65^{26}	7^{18}	84^{22}	21^{6}	82^{19}	29^{10}
5	*Alpena*§...........	92	—8	100	37^{2}	-8^{28}	49^{23}	-2^{19}	69^{27}	1^{18}	83^{22}	21^{7}	81^{22}	27^{11}
6	Harrisville‡......	94	—11	105	44^{8}	-11^{27}	50^{24}	-5^{4}	70^{27}	0^{17}	82^{22}	$23^{3,7}$	89^{22}	21^{10}
7	*Grand Haven*§....	85	0	85	$41^{8,9}$	0^{28}	$46^{25,27}$	0^{14}	64^{10}	7^{17}	72^{21}	23^{7}	84^{19}	31^{10}
8	*Port Huron*§......	90	—4	94	39^{8}	-3^{28}	57^{28}	-4^{5}	68^{27}	9^{18}	80^{22}	27^{8}	85^{22}	33^{1}
9	Thornville‡.......	88	—3	91	40^{9}	-3^{28}	51^{28}	-2^{5}	66^{27}	9^{18}	81^{22}	25^{4}	87^{22}	33^{1}
10	Lansing, S. B. of H.‡¶	90	—5	95	41^{9}	-4^{27}	52^{28}	-5^{5}	69^{27}	5^{17}	82^{22}	24^{14}	88^{19}	$32^{10,14}$
11	Ann Arbor‖......	91	—7	98	41^{9}	-4^{28}	54^{28}	-7^{5}	69^{27}	8^{18}	83^{22}	23^{15}	90^{19}	31^{11}
12	Birmingham‡.....	......	......	......	42^{10}	-7^{28}	50^{28}	$-7^{4,5}$	69^{27}	$8^{17,18}$	85^{22}	24^{3}	......	......
13	*Detroit*§	91	—4	95	40^{2}	0^{28}	54^{28}	-4^{5}	64^{27}	10^{18}	81^{22}	28^{8}	87^{19}	34^{10}

* The names of observers, etc., are stated in Table I.

† The line No. 1, and the three columns for the year 1902, relate only to the eleven stations from which observations were received for every month of the year. It does not include Birmingham.

‡ For stations marked thus ‡, the daily readings of registering thermometers were recorded at 7 A. M. for the preceding calendar day.

§ At the stations of the U. S. Weather Bureau, the maximum thermometer was read and recorded at 8:00 A. M., and the minimum at 8:00 P. M., 75th Meridian time. The local time at these stations corresponding to 8:00 A. M. and 8:00 P. M., 75th Meridian time, is as follows: At Port Huron, 7:30 A. M. and 7:30 P. M.; at Detroit, 7:28 A. M. and 7:28 P. M.; at Alpena, 7:26 A. M. and 7:26 P. M.; at Grand Haven, 7:15 A. M. and 7:15 P. M.; at Marquette, 7:11 A. M. and 7:11 P. M.; at Sault Ste Marie, 7:23 A. M. and 7:23 P. M.

‖ At Ann Arbor, the registering thermometers were read at 9 P. M.

¶ Beginning with the year 1885 allowance must be made for Lansing in Table XIV, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit B, on page 22, report for 1886.

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperature, state the day or days of the month on which the highest or lowest temperature occurred.

and the lowest temperature occurred by months of the year 1902;* also, extremes daily readings of registering thermometers, or by observations made daily at 7 the United States Weather Bureau.

June.		July.		August.		September.		October.		November.		December.		Line number.
Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	
88	35	94	45	89	41	85	36	75	25	70	14	47	−5	1
78^{15}	35^{5}	90^{7}	50^{3}	87^{2}	45^{9}	75^{14}	39^{12}	70^{4}	32^{21}	58^{4}	14^{30}	42^{11}	4^{9}	2
75^{2}	36^{5}	84^{6}	45^{16}	81^{2}	43^{12}	76^{17}	36^{12}	63^{6}	26^{29}	58^{2}	15^{28}	42^{19}	-5^{26}	3
88^{21}	39^{4}	92^{4}	46^{9}	$84^{2\cdot 29}$	45^{11}	80^{17}	40^{13}	69^{26}	27^{16}	68^{2}	25^{29}	$44^{1,2}$	2^{13}	4
79^{2}	39^{5}	92^{6}	47^{16}	84^{31}	42^{12}	78^{8}	87^{14}	71^{6}	25^{17}	67^{13}	17^{28}	42^{19}	2^{14}	5
87^{2}	40^{10}	94^{5}	$48^{10\cdot 15}$	$85^{26\cdot 31}$	41^{11}	79^{2}	37^{4}	73^{24}	$27^{16\cdot 20}$	68^{13}	16^{27}	47^{2}	6^{8}	6
$82^{12\cdot 14}$	45^{5}	85^{3}	52^{1}	$80^{1,9,30}$	46^{23}	79^{17}	$40^{13\cdot 14}$	67^{23}	32^{17}	65^{14}	$27^{25,27}$	46^{1}	10^{14}	7
83^{2}	41^{9}	90^{6}	46^{1}	84^{31}	48^{12}	81^{1}	37^{14}	75^{26}	31^{29}	68^{12}	19^{28}	47^{21}	5^{14}	8
$85^{2,15}$	$43^{9\cdot 23}$	$88^{4,7,28}$	47^{1}	82^{2}	$47^{12\cdot 23}$	81^{8}	40^{14}	73^{26}	30^{17}	70^{13}	20^{28}	46^{21}	6^{27}	9
88^{15}	$41^{22,25}$	90^{4}	49^{10}	89^{30}	44^{11}	84^{1}	38^{13}	74^{24}	$28^{20,28}$	$69^{1,13}$	$20^{27\cdot 28}$	46^{1}	2^{26}	10
87^{15}	42^{28}	91^{4}	47^{1}	88^{30}	44^{12}	85^{22}	36^{14}	75^{24}	31^{22}	70^{2}	18^{28}	$44^{1,21}$	2^{27}	11
$85^{2,15}$	39^{8}	$90^{6,8}$	48^{10}	......	....	......	....	......	....	......	....	......	....	12
8^{15}	46^{9}	91^{4}	49^{1}	86^{3}	51^{8}	83^{1}	40^{14}	75^{26}	31^{29}	69^{12}	22^{28}	46^{21}	8^{31}	13

TABLE XV.—*Average daily range of temperature, by registering thermometers for the year and by months of the year 1902, at each of 13 stations in Michigan, and also an average line for 12 stations.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in italics.)	Divisions of the State.†	Normal.‡	Average daily range of temperature.—Degrees Fahr.												
			Year 1902.	Months, 1902.											
				Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 12 stat'ns§	....	......	16.80	14.07	16.30	16.63	17.75	19.70	18.65	19.11	19.32	17.16	17.85	13.73	11.28
Marquette.........	U. P.	14.61^{17}	12.81	11.20	10.30	10.80	11.00	16.00	15.90	16.90	15.50	14.20	12.80	9.60	9.50
Sault Ste. Marie...	U. P.	16.94^{11}	15.72	15.50	16.60	16.50	16.40	18.70	16.50	19.60	16.40	14.70	14.60	10.00	13.10
Traverse City....	N. W.	19.52^{21}	17.97	14.52	19.46	16.94	20.43	$\overset{b}{21.50}$	21.03	21.19	$\overset{c}{18.19}$	16.57	19.39	14.87	$\overset{a}{11.59}$
Alpena............	N. E.	15.53^{23}	16.00	15.00	16.00	15.00	17.00	16.00	18.00	19.00	19.00	15.00	17.00	14.00	11.00
Harrisville........	N. E.	19.75^{18}	19.18	21.10	21.79	17.32	19.57	18.23	20.10	20.84	20.45	17.63	21.81	17.17	14.09
Grand Haven.....	W.	15.12^{13}	14.04	10.90	13.30	15.40	15.40	18.00	15.40	13.80	17.30	14.00	14.30	11.40	9.30
Port Huron.......	B. & E.	15.87^{23}	16.14	13.10	14.50	14.40	17.30	19.20	18.70	19.30	17.70	16.80	18.00	13.90	10.80
Thornville........	B. & E.	20.80^{23}	15.42	10.97	14.25	16.68	16.37	19.13	18.03	17.77	18.29	16.00	16.97	12.73	7.84
Agr'l College.....	C.	21.09^{21}	20.63	15.77	21.22	21.29	21.65	23.84	21.93	22.75	25.09	22.37	22.07	16.93	12.68
Lansing, S.B of H.	C.	19.34^{24}	18.17	14.52	16.64	19.65	20.03	22.03	20.13	20.06	22.87	20.83	20.71	15.60	11.45
Ann Arbor........	S. C.	18.72^{21}	19.79	15.30	18.40	20.10	21.60	24.30	20.52	21.00	24.00	21.50	21.00	16.30	13.40
Birmingham......	S. E.	......	¶	20.39	21.00	21.90	23.60	.....	21.13	23.71	.....	.....	.....	.....	.....
Detroit............	S. E.	15.43^{24}	15.16	10.90	13.10	15.50	16.30	19.50	17.60	17.10	17.10	16.30	15.60	12.30	10.60

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The counties in each division are stated in Exhibit I, in the annual report for 1898.

‡ Numbers in this column state the annual average range of temperature for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the range of temperature, denote the number of years included in the average.

§ This line is an average for all stations for which statements nearly complete are given for every month of the year. It does not include Birmingham.

¶ The average for 6 months is 21.96.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, stand directly above the numbers from which they refer to the notes below.

a For 29 days. b For 28 days. c For 16 days.

Graphic representations of statements in Table XV are given in Diagram II.

TABLE XVI.—*Comparisons of the extremes and the range of temperature (degrees Fahr.) during the year, and during each month of the year 1902, with the average of the extremes, and of the range, for the 25 years, 1877-1901, also statement of the extremes and of the range for each of the seven years, 1896-1902. Observations made with registering thermometers by observers for the State Board of Health, and for the U. S. Weather Bureau. These comparisons, etc., are for groups of several stations in Michigan.*

Year and months	Extremes and ranges of temperature.—Degrees Fahrenheit.																										
	1896.			1897.			1898.			1899.			1900.			1901.			Av. for 25 years, 1877-1901.			1902.*			1902 higher (+) or lower (−) than av. 25 years, 1877-1901.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Year..	98	-25	123	102	-21	123	100	-18	118	104	-37	141	103	-22	125	108	-18	126	100	-25	125	94	-14	108	-6	+11	-17
Av.mo.	78	9	69	78	10	68	79	13	66	83	10	73	79	15	64	78	15	63	79	11	68	74	16	58	-5	+5	-10
Jan...	45	-25	70	58	-19	77	58	-10	68	51	-28	79	54	-14	68	54	-17	71	54	-20	74	44	-14	58	-10	+6	-16
Feb...	59	-22	81	46	-21	67	57	-18	75	60	-37	97	63	-22	85	41	-12	53	55	-21	76	57	-10	67	+2	+11	-9
March	69	-16	85	70	-14	84	70	-3	73	66	-13	79	49	-12	61	70	-18	88	66	-13	79	70	-6	76	+4	+7	-3
April..	87	7	80	79	5	74	78	8	70	91	5	86	83	18	65	84	19	65	83	9	74	84	13	71	+1	+4	-3
May..	98	33	65	84	22	62	83	29	54	93	27	66	92	24	68	85	31	54	89	24	65	90	21	69	+1	-3	+4
June..	91	37	54	92	27	65	96	39	57	97	37	60	99	35	64	99	34	65	96	33	63	88	35	53	-8	+2	-10
July..	95	39	56	102	46	56	99	37	62	104	42	62	98	42	56	108	47	61	99	40	59	94	45	49	-5	+5	-10
Aug..	96	35	61	94	38	56	100	42	58	104	42	62	103	46	57	94	44	50	97	38	59	89	41	48	-8	+3	-11
Sept..	88	22	66	98	28	70	98	32	66	103	21	82	95	36	59	93	33	60	94	29	65	85	36	49	-9	+7	-16
Oct...	77	15	62	91	25	66	89	16	73	85	21	64	89	25	64	81	22	59	84	19	65	75	25	50	-9	+6	-15
Nov..	67	-3	70	65	-5	70	67	3	64	84	19	65	69	10	59	63	7	56	69	2	67	70	14	56	+1	+12	-11
Dec...	59	-16	75	57	-16	73	51	-17	68	59	-17	76	54	-7	61	59	-10	69	58	-11	69	47	-5	52	-11	+6	-17

* For the twenty-six years, 1877-1902, the highest temperature was 108° at Marquette, July 15, 1901; the lowest was —37°, at Sault Ste. Marie, February 10, 1899.

TABLE XVII.—*Average absolute humidity, by year and months in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Absolute humidity.—Grains of vapor in a cubic foot of air.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 years, 1877-1901........	3.48	1.45	1.48	1.82	2.85	4.03	5.55	6.12	5.83	4.95	3.56	2.33	1.77
1901 (7 stations)....	3.51	1.43	.95	1.91	2.83	3.91	5.76	6.86	6.13	5.01	3.56	2.13	1.58
1902 (5 stations)....	3.44	1.33	1.26	2.24	2.68	4.19	4.92	6.58	5.48	4.67	3.41	2.98	1.53
In 1902 greater than av. for 25 years, 1877-1901..	....	......	......	.42	......	.16	......	.46	......	......	......	.65	.....
In 1902 less than av. for 25 years, 1877-1901..........	.04	.12	.22	......	.17	......	.63	......	.35	.28	.15	.....	.24
In 1902 greater than in 1901......	....	.....	.31	.33	......	.28	.....	......	......	......	......	.85	......
In 1902 less than in 1901............	.07	.10	......	......	.15	......	.84	.28	.65	.34	.15	......	.05

* At from 6 to 23 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 27, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Table XVII., because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, on page 23, report for 1886.

TABLE XVIII.—*Average relative humidity, by years and months, in 1902, compared with annual and monthly averages for 1901, and for the 24 years, 1878-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Per cent of saturation.—Relative humidity.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 24 years, 1878-1901........	77	83	82	79	71	71	73	72	74	76	77	80	83
1901 (8 stations)....	78	82	78	80	71	76	75	74	77	78	76	80	84
1902 (6 stations)....	79	81	80	78	72	75	79	81	78	80	77	80	83
In 1902 greater than av. for 24 years, 1878-1901..	2	......	......	......	1	4	6	9	4	4	0	0	0
In 1902 less than av. for 24 years, 1878-1901	....	2	2	1	.....	......	......	......	......	......	......	......	......
In 1902 greater than in 1901......	1	......	2	......	1	......	4	7	1	2	1	0	......
In 1902 less than in 1901...........	....	1	......	2	......	1	......	......	......	......	......	......	1

* At from 7 to 22 stations per year for the 24 years, 1878-1901. Just which stations in each year, up to 1897, are shown on page 28, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Table XVIII., because of a change in the location of instruments. The amount of the variation is shown in Exhibit D, on page 23, report for 1886.

TABLE XIX.—ABSOLUTE HUMIDITY.—*The average number of grains of vapor of water in a cubic foot of air for months and year 1902, at 6 stations in Michigan; also average line for the 5 stations.—Average of observations made daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Grains of vapor in a cubic foot of air.—(Absolute humidity.)‡													
		Year.		Months, 1902.											
		Norm. §	1902.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 5 stations¶	....	......	3.44	1.33	1.26	2.24	2.68	4.19	4.92	6.58	5.48	4.67	3.41	2.98	1.53
Traverse City....	N. W.	3.42^{21}	3.42	1.71	1.56	[a] 2.24	2.71	[d] 4.10	4.59	6.31	[e] 5.48	4.61	3.22	[b] 2.94	[c] 1.59
Harrisville........	N. E.	3.12^{8}	3.15	0.95	0.84	1.94	2.54	3.50	4.39	6.23	5.30	4.58	3.42	2.89	1.21
Thornville........	B. & E.	3.66^{26}	3.63	1.55	1.48	2.45	2.82	4.54	5.31	6.75	5.41	4.78	3.48	3.13	1.85
Lansing, S. B. of H.‖	C.	3.40^{24}	3.47	1.25	1.25	2.29	2.69	4.39	5.14	6.62	5.44	4.66	3.41	3.03	1.51
Ann Arbor.......	S. C.	3.59^{3}	3.53	1.21	1.18	2.30	2.63	4.43	5.16	7.01	5.79	4.73	3.52	2.92	1.47
Birmingham......	S. E.	......	**	[a] 1.39	1.33	2.69	3.14	.....	5.60	7.75	.....	.....	.....	.....	.....

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* The names of the observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and in preceding reports.

‡ The number of grains of vapor in a cubic foot of air at each observation was determined from readings of the psychrometer by means of Glaisher's table, Table XII, of the Smithsonian Meteorological and Physical Tables (1859.)

§ Numbers in this column state the average annual absolute humidity for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the absolute humidity denote the number of years included in the average.

¶ This line is an average for the 5 stations from which statements complete, or nearly complete were received for every month of the year. It does not include the line for Birmingham.

‖ Beginning with the year 1885, allowance must be made for Lansing in Table XIX because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, page 23, report for 1886.

** The average for 6 months is 3.65.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

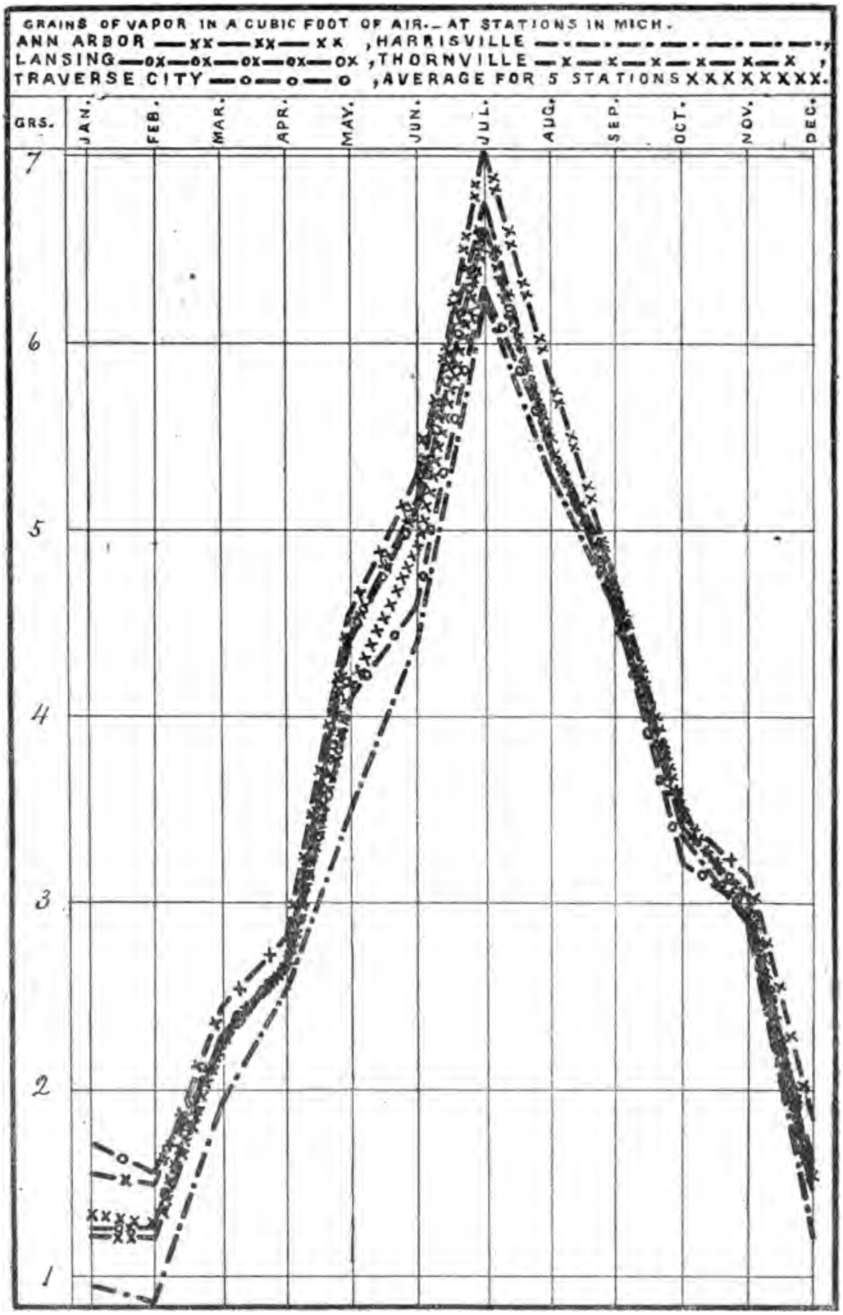
a For 92 observations. b For 89 observations. c For 87 observations.

d For 85 observations. e For 51 observations.

NOTE.—The computations of absolute humidity at Ann Arbor for each month in 1902 were furnished by the observer there. All other computations in Table XIX were made at the office of the Secretary of the State Board of Health.

The "average" line and the lines for the five stations in Table XIX are graphically represented in Diagram III.

DIAGRAM III.—ABSOLUTE HUMIDITY, BY MONTHS, 1902.



[PLATE 1165]

TABLE XX.—Relative Humidity.—*Average per cent of saturation of the atmosphere with vapor of water for months and year 1902, at 7 stations in Michigan; also average line for the 6 stations. Average of observations made daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Per cent of saturation.—Relative humidity.													
		Year.		Months, 1902.											
		Norm ‡	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 6 stations§	....	......	79	81	80	78	72	75	79	81	78	80	77	80	83
Traverse City....	N. W.	81^{21}	79	92	90	$\overset{a}{80}$	73	$\overset{d}{76}$	77	77	$\overset{e}{71}$	75	75	$\overset{b}{79}$	$\overset{c}{82}$
Harrisville........	N. E.	71^{8}	73	57	52	69	72	76	80	83	79	81	80	79	68
Thornville........	B. & E.	78^{25}	79	88	87	76	67	72	78	77	74	78	74	81	91
Agr'l College....	C.	81^{39}	91	97	97	99	88	85	86	89	90	90	83	90	99
Lansing, S. B. of H.¶........	C.	72^{24}	72	73	74	68	63	66	72	76	73	76	70	74	76
Ann Arbor.......	S. C.	78^{3}	79	79	82	77	70	75	78	83	78	80	80	79	83
Birmingham......	S. E.	......	‖	$\overset{a}{82}$	81	75	75	.....	83	85	.....	.....	.....	.....	.....

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and in preceding reports.

‡ Numbers in this column state the average annual relative humidity for periods of years ending in each case with December 31, 1902. The small figures above and at the right of the numbers which state the relative humidity, denote the number of years included in the average.

§ This line is an average for the 6 stations from which statements complete, or nearly complete were received for every month in the year. It does not include the line for Birmingham.

¶ Beginning with the year 1885, allowance must be made for Lansing in Table XX, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit D, on page 23, report for 1886.

‖ The average for 6 months is 80.

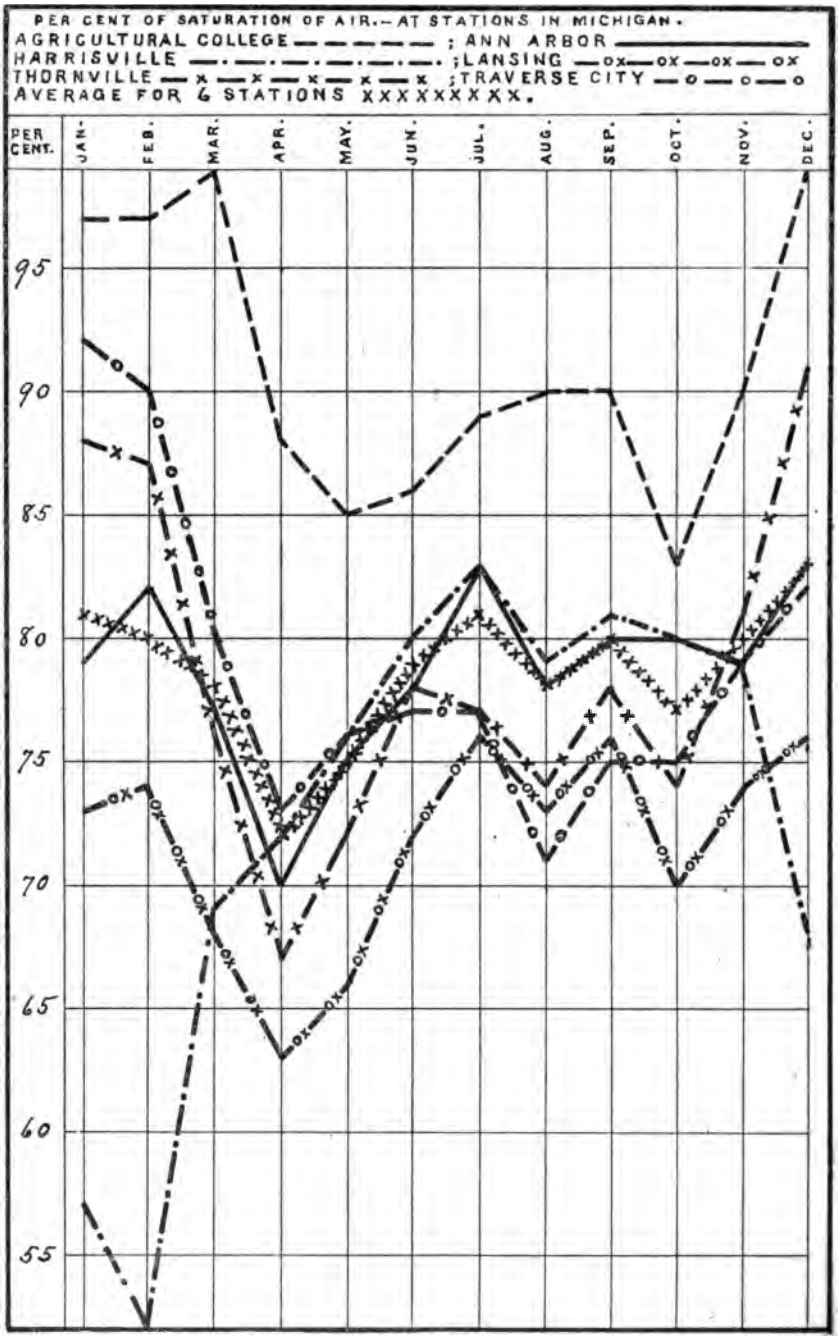
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations. b For 89 observations. c For 87 observations.
d For 85 observations. e For 51 observations.

Note.—The observations in Table XX were reduced by Guyot's table, in Smithsonian Meteorological Tables, or by a table substantially the same as that. Computations for Ann Arbor in 1902 were made by the observers there. All other computations in Table XX were made at the office of the State Board of Health.

Graphic representations of seven representative lines in Table XX are given in Diagram IV.

DIAGRAM IV.—RELATIVE HUMIDITY, BY MONTHS, 1902.



[PLATE 1166]

Fogs.—For the year 1902, fog was reported at 21 morning observations, at 3 afternoon observations (at about 2 P. M.), at 5 evening observations (at about 9 P. M.), and four times during the day, no special time being mentioned, in many cases the same fog, or fog at the same time, being reported by different observers. Fog was reported, at one or more stations at some time during the day, on 27 days.

TABLE XXI.—*Number of different days on which fog was observed at one or more of 6 stations in Michigan* in 1902, and each month of the year 1902.*

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
27	1	2	5	0	1	2	1	5	8	1	1	0

* This exhibit contains statements only for those localities from which reports were received for every month of the year, as follows: Harrisville, Traverse City, Thornville, Lansing, Ann Arbor and Detroit.

Table XXI, "Number of different days on which fog was observed," etc., supplies knowledge of the *time,* in each month, on which fog was observed, somewhere in Michigan. Table XXII, "Number of observations at which fog was observed," etc., supplies knowledge of the *time* combined with the *area* of the occurrences of fog. For the State as a whole, therefore, the last mentioned exhibit supplies the most important information. Therefore, in this report the diagram relative to fog is made to exhibit the facts contained in this last-mentioned table. Heretofore it has represented the "Number of different days on which fog was observed at one or more stations in Michigan."

TABLE XXII.—*Number of observations at which fog was observed in Michigan in 1902, and in each month of the year 1902. (Observations taken three times daily,* at 6 stations.)*†

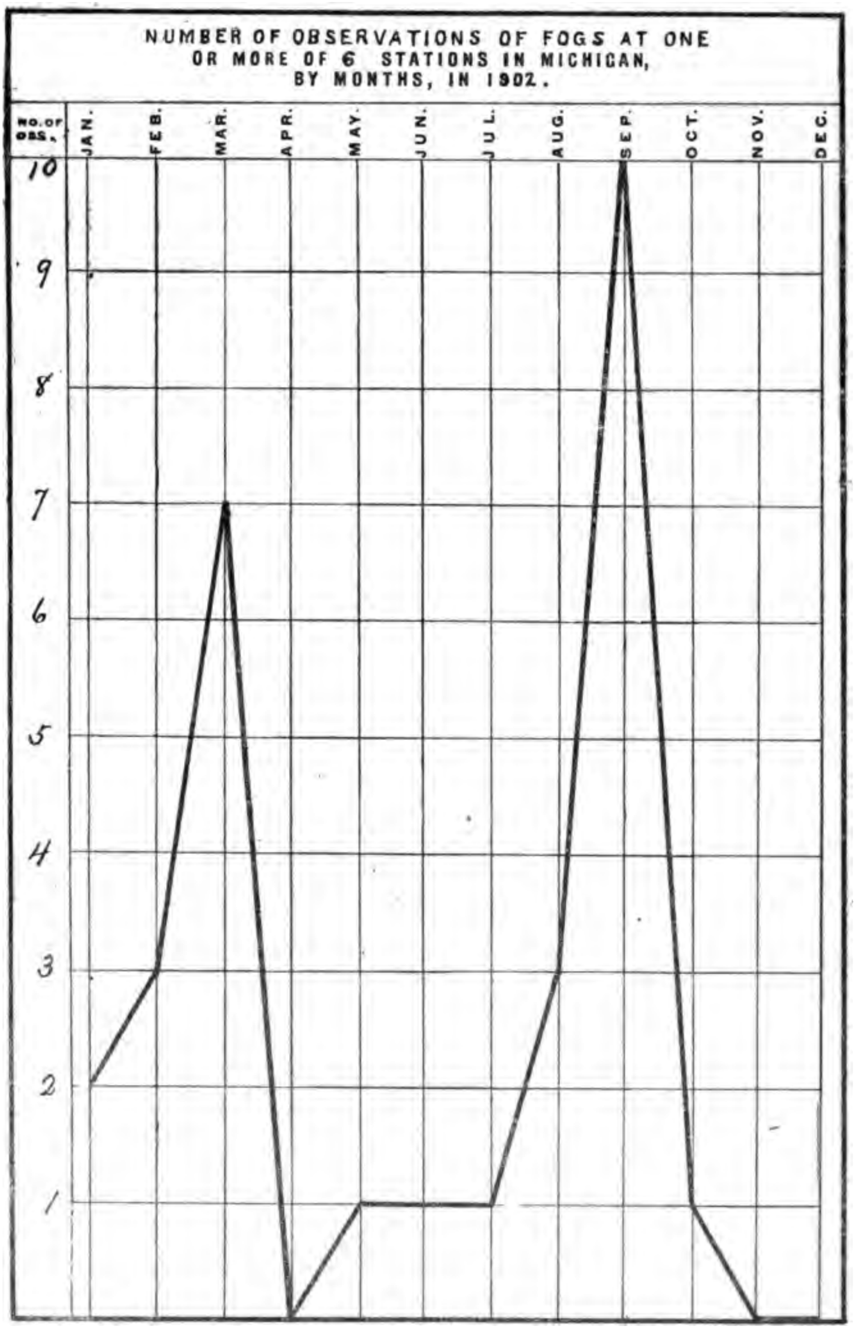
Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
29	2	3	7	0	1	1	1	3	10	1	0	0

* At the U. S. Weather Bureau Stations the observations were made at 8 A. M. and 8 P. M., 75th Meridian time.

† This exhibit contains statements only for those localities from which registers were received for every month of the year; the localities are stated in a foot-note to Table XXI, above.

Graphic representations of statements in Table XXII are given in Diagram V.

DIAGRAM V.—CONCERNING FOGS IN MICHIGAN, IN 1902.



[PLATE 1167]

TABLE XXIII.—*Average per cent of cloudiness for months and year 1902, at 7 stations in Michigan; also average line for the 6 stations. Average of observations made daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Average per cent of cloudiness.													
		Year.		Months, 1902.											
		Norm. ‡	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 6 stations§	....	......	58	67	55	51	57	52	59	52	41	59	56	68	78
Traverse City....	N. W.	59^{21}	59	78	66	$\overset{a}{49}$	53	$\overset{d}{55}$	51	44	$\overset{e}{38}$	56	56	79	$\overset{c}{82}$
Harrisville........	N. E.	62^{18}	64	74	52	50	70	66	71	55	45	$\overset{b}{68}$	64	71	79
Thornville........	B. & E.	51^{26}	56	60	47	51	57	51	59	54	31	66	57	58	78
Agr'l College	C.	56^{39}	49	60	41	44	46	34	47	44	34	52	51	61	70
Lansing, S. B. of H..........	C.	57^{24}	60	68	61	57	56	52	59	54	45	61	54	68	79
Ann Arbor.......	S. C.	56^{23}	59	60	61	57	59	51	65	58	47	52	52	68	78
Birmingham......	S. E.	......	¶	56	54	55	61	.....	60	39	.....	.....	.....	.....	.....

* The names of the observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The full names of divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Numbers in this column state the average per cent of cloudiness for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the per cent of cloudiness, denote the number of years included in the average.

§ This line is an average for all the stations from which statements, complete, or nearly complete, were received for every month of the year. It does not include Birmingham.

¶ The average for 6 months is 54.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 91 observations. b For 89 observations. c For 88 observations. d For 86 observation. e For 51 observations.

Graphic representations of seven representative lines in Table XXIII are given in Diagram VI.

Diagrams relating to meteorological conditions.—Most of the diagrams in this paper are to be read by tracing each irregular line across the diagram from left to right, and noting at what point it intersects each of the perpendicular lines having the name of the month at the top. What station is represented by the irregular line may be learned from the head of the diagram. The degree of value denoted by the intersection may be learned by referring to the figures in the left-hand column. Thus in Diagram I, relating to average temperature in 1902, tracing the line "— · —" representing Harrisville, it may be seen that the average temperature at Harrisville was, in May, about 50°, in October about 47°, in November about 42°, etc. Definite numerical statements of the average temperature for each month at each station may be found in Table IX, and accompanying each diagram is a table giving exact numerical statements for the conditions represented. The average lines given in each table are represented in the corresponding diagram by an × line, thus × × × ×. The lines in the diagrams give more ready general comparisons of stations with each other, or of months, with each other, than is possible from the mere numerical statements. By Diagram II, it appears at a glance that the average daily range of temperature at the Agricultural College in 1902 was, during August, greater than at any other of the

twelve stations represented in that diagram, and during December was less at Thornville. The marked agreement in the course of lines in Diagram I, representing mean monthly temperature at six stations, and also that the agreement is closer in November and December than in the other months, appear at once on reference to the diagram. The resemblance between the lines in Diagram I, relating to mean temperature by months in 1902, and those in Diagram III, relating to absolute humidity of the atmosphere for the same periods, is apparent. By Diagram X, it appears that in every month of the year the highest velocity of the wind (on an average for the month) is reached between 12 M. and 2 P. M., and that the lowest velocity occurs in the latter part of the night or in early

TABLE XXIV.—*Average per cent of cloudiness, by year and months, in 1902, compared with annual and monthly averages for 1901, and for 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Per cent of cloudiness.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 yrs., 1877-1901	55	71	65	58	52	50	45	40	42	44	55	69	74
1901 (8 stations)....	56	75	60	68	52	59	41	38	48	44	41	71	68
1902 (6 stations)....	58	67	55	51	57	52	59	52	41	59	56	68	78
In 1902 greater than av. for 25 years, 1877-1901..	3	......	......	......	5	2	14	12	......	15	1	......	4
In 1902 less than av. for 25 years, 1877-1901..........	....	4	10	7	......	......	.....	......	1	......	......	1	......
In 1902 greater than in 1901......	2	......	......	......	5	......	18	14	......	15	15	......	10
In 1902 less than in 1901............	....	8	5	17	......	7	......	......	7	......	......	3	......

* At from 8 to 23 stations per year for the twenty-five years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 48, report for 1898.

TABLE XXV.—*Dates of solar and lunar halos*

Line number.	Stations.	Dates of halos recorded,									
		January.		February.		March		April.		May.	
		Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.
1	Port Huron......	......	......	....	....	....	....	....	....	......	......
2	Lansing..........	1, 28	10	5, 11, 22	20	4, 6, 10, 14, 21, 22, 24, 26	21, 22, 24	5, 24	14, 15, 20, 21	24	15, 21
3	Detroit..........	......	......	22, 26	23, 27	6, 21	4, 21, 22, 24, 25	5, 16, 22, 24, 28	15, 16	......	......

morning, and that in 1902 at Lansing, the months of most wind were April, October and December. By reference to Diagram XI, it may be seen that at other stations in Michigan where records of actual miles of wind traveled were kept, December was in 1902 the month of greatest wind. These statements illustrate the reading of the diagrams for any use it may be desired to make of the tables and diagrams.

Diagrams XII, XIII, XIV and XV, relating to the direction of the wind, are constructed on a plan different from that of the other diagrams. A description of the plan of their construction, method of reading, etc., is printed on page 62 of the annual report for 1898, and in preceding reports.

TABLE XXVI.—*Inches of rain and melted snow, by year and months in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Inches of rain and melted snow.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 yrs., 1877-1901.	33.73	2.23	2.28	2.27	2.40	3.46	3.52	3.07	2.95	3.02	3.04	3.00	2.50
1901 (13 stations)...	29.11	1.69	1.31	2.69	1.65	2.68	2.44	4.30	2.75	2.40	3.19	1.47	2.53
1902 (12 stations)...	34.34	.82	.92	2.49	1.73	3.75	5.15	6.16	1.66	4.42	2.52	2.40	2.32
In 1902 greater than av. for 25 years, 1877-1901..	.61	......	......	.22	......	.29	1.63	3.09	......	1.40	......	......	......
In 1902 less than av. for 25 years, 1877-1901..........	....	1.41	1.36	......	.67	......	......	......	1.29	......	.52	.60	.18
In 1902 greater than in 1901......	5.23	......	......	......	.08	1.07	2.71	1.86	......	2.02	......	.93	......
In 1902 less than in 1901...........	....	.87	.39	.20	......	......	......	......	1.09	......	.67	......	.21

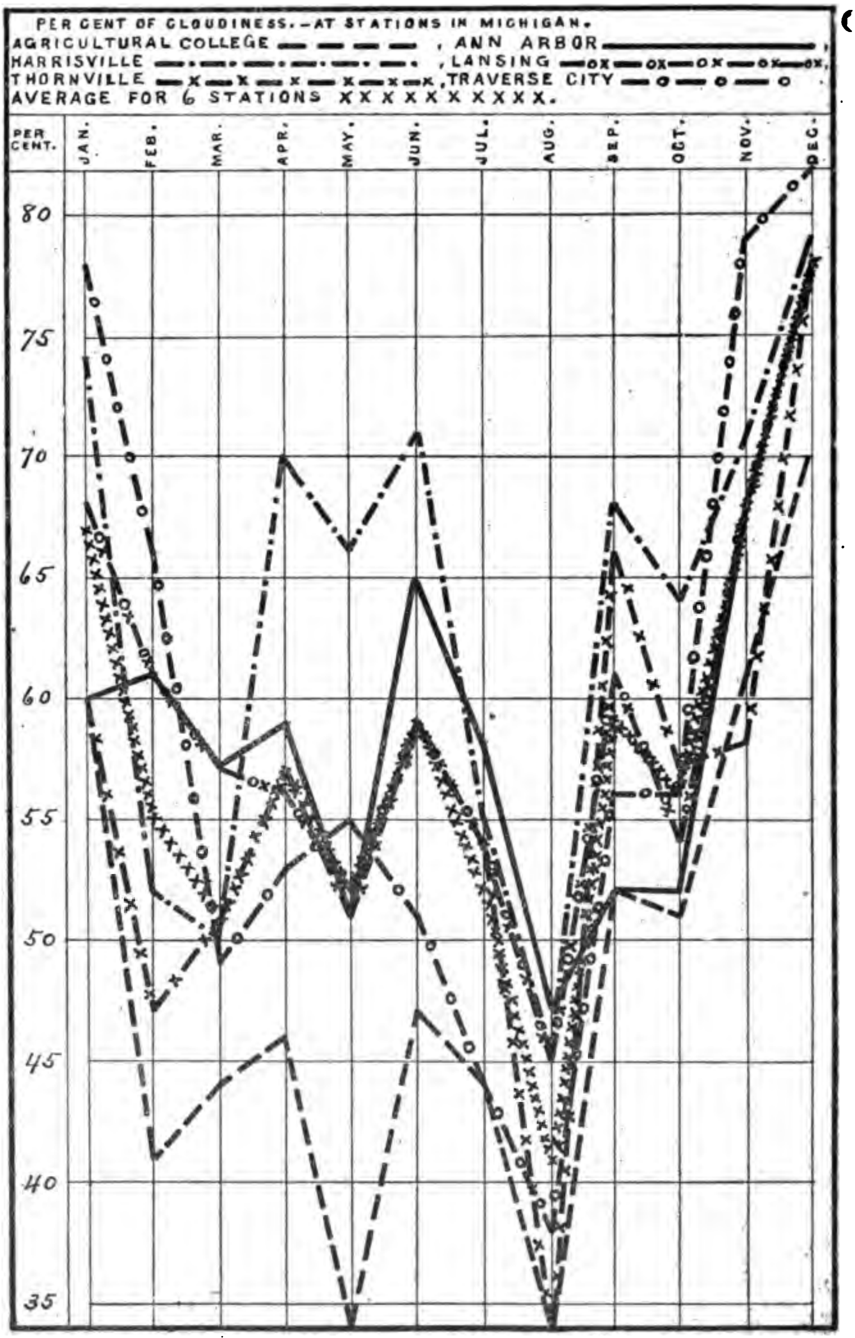
* At from 12 to 23 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 50, report for 1898.

recorded on monthly registers in 1902.

months, 1902.														
June.		July.		August.		September.		October.		November.		December.		Line number.
Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	
....	.....	....	......	....	12	8, 23	......	....	......	....	......	25	12, 14	1
....	17	....	......	....	......	....	......	11, 21	10	....	......	....	12	2
....	28	....	......	....	......	....	......	....	......	....	......	....	......	3

Parhelia, Jan. 27; Feb. 11; March 4; April 24; October 11.—*Lansing.*

DIAGRAM VI.--AV. PER CENT OF CLOUDINESS, BY MONTHS, 1902.



[PLATE 116.8]

TABLE XXVII.—*Inches of rain and melted snow for months and year 1902, at 13 stations in Michigan; also average line for 12 stations,—as compiled from daily observations made by observers* for the State Board of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in italics.)	Divisions of the State.†	Inches of rain and melted snow.													
		Year.		Months. 1902.											
		Norm. ‡	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 12 stations§	....	......	34.34	.82	.92	2.49	1.73	3.75	5.15	6.16	1.66	4.42	2.52	2.40	2.32
Marquette	U. P.	31.78^{17}	26.77	1.75	1.24	.67	3.33	2.14	2.98	2.14	2.17	1.20	1.97	3.39	3.79
Sault Ste. Marie..	U. P.	32.04^{11}	26.00	.98	.58	.95	2.00	2.60	3.04	2.20	1.54	2.44	4.42	3.54	1.71
Traverse City....	N. W.	36.02^{21}	31.95	1.10	1.51	3.26	1.88	3.83	3.47	4.44	1.70	3.02	2.76	2.68	2.30
Alpena............	N. E.	33.78^{30}	29.02	.77	.56	1.51	2.54	2.98	3.14	5.60	2.53	2.44	2.34	2.86	1.75
Harrisville........	N. E.	33.37^{16}	31.77	1.67	.95	3.31	1.72	2.81	4.11	6.78	1.79	1.81	3.44	1.94	1.44
Grand Haven	W.	33.40^{12}	34 81	.53	1.48	3.64	1.59	4.58	3.85	4.85	.53	5.23	3.17	2.76	2.60
Port Huron	B. & E.	31.16^{28}	35.77	.52	.76	2.05	1.25	4.53	5.30	5.29	4.05	6.27	2.57	1.75	1.43
Thornville........	B. & E.	32.14^{26}	40.99	.72	.81	1.87	1.49	4.15	6.64	9.23	3.21	5.90	2.75	1.61	2.61
Agr'l College	C.	31.07^{39}	39.32	.43	.66	3.11	1.78	4.71	7.28	7.90	.68	5.88	1.53	2.46	2.90
Lansing, S. B. of H..........	C.	33.03^{23}	38.31	.23	.50	4.06	1.78	4.39	7.43	7.28	.44	5.94	1.76	2.41	2.09
Ann Arbor.......	S. C.	30.18^{15}	41.59	.60	1.21	2.73	.77	4.72	7.56	10.70	.63	6.41	1.95	1.83	2.48
Birmingham......	S. E.	......	¶	.47	.60	2.46	2.60	.....	4.15	1.08	.....	.....	.....	.....	.....
Detroit	S. E.	32.40^{31}	35.53	.57	.72	2.66	.60	3.52	6.97	7.55	.60	6.50	1.54	1.57	2.73

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The names of divisions, and the counties in each, are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Numbers in this column state the annual average rainfall for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the rainfall denote the number of years included in the average.

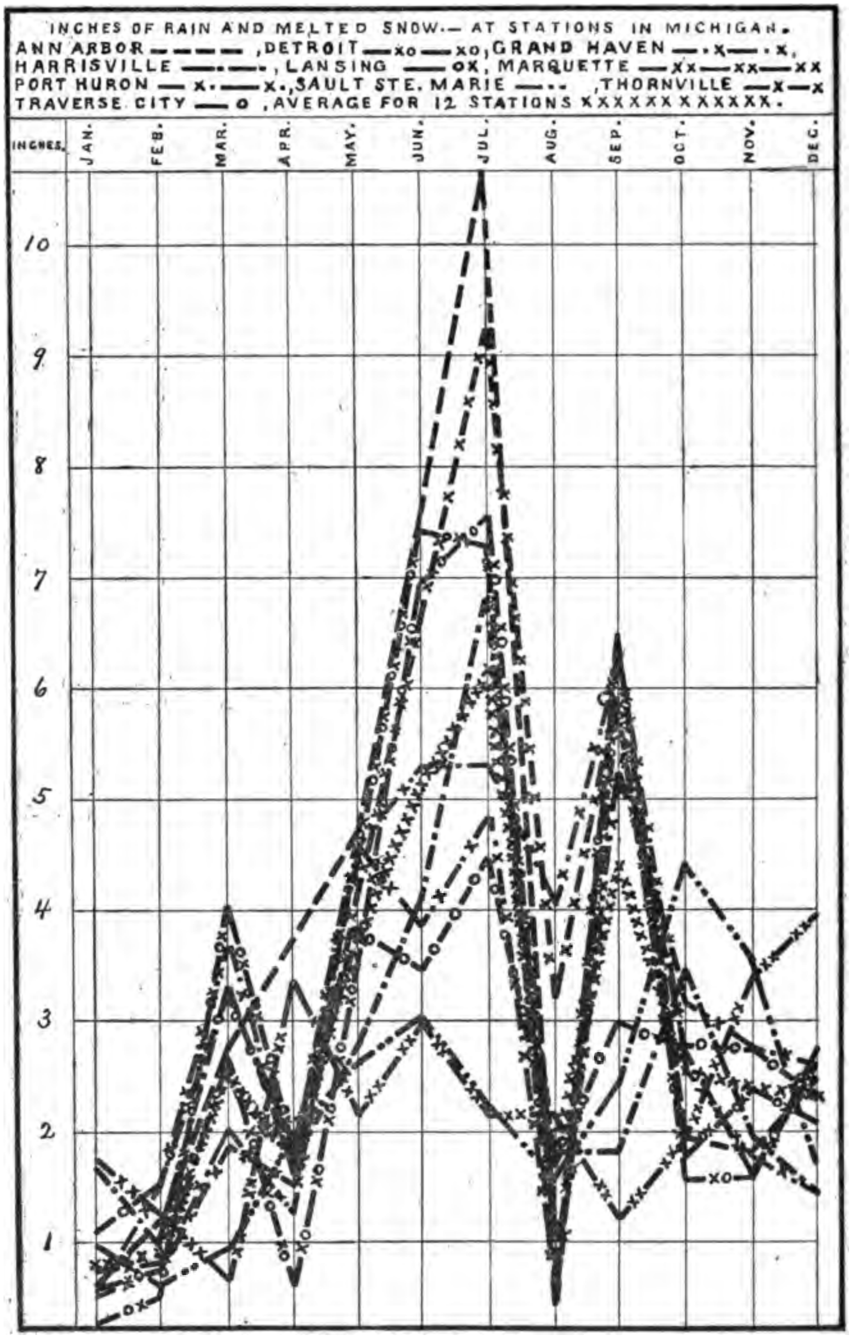
§ This line is an average for all the stations, from which statements are given for every month of the year. It does not include the line for Birmingham.

¶ The total rainfall for 6 months is 11.36 inches.

NOTE.—The computations of amount of rainfall were furnished by the observers at Detroit, Alpena, Grand Haven, Port Huron, Ann Arbor, Sault Ste. Marie, Marquette, and the Agricultural College for the year. All other computations in Table XXVII were made in the office of the Secretary of the State Board of Health.

The average line and lines for the twelve representative stations in Table XXVII are graphically represented in Diagram VII.

DIAGRAM VII.—RAINFALL, BY MONTHS, 1902.



[PLATE 1169]

TABLE XXVIII.—*Relative amount of ozone in the atmosphere by day, for months and year 1902, at 7 stations, also average line for 5 stations in Michigan, as indicated by averages of observations made daily by exposing test-paper prepared according to Schonbein's formula, from 7 A. M., to 2 P. M.—Recorded according to a scale of 10 degrees of coloration of the test-paper (greatest coloration by ozone equals 10) by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in italics.)	Divisions of the State.†	Degrees of coloration of test-paper.—Day observations.‡													
		Year.		Months, 1902.											
		Norm. §	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.[1]	Dec.
Av. for 5 stations¶	....	......	3.74	3.95	4.12	4.07	4.01	4.21	4.27	3.38	4.04	3.09	3.12	3.05	3.60
Traverse City....	N. W.	5.44^{21}	6.34	6.38	6.40	6.53	6.57	[b] 6.98	6.57	6.17	[f] 7.02	5.94	5.66	[b] 5.63	[b] 6.22
Harrisville........	N. E.	3.41^{18}	2.64	3.18	2.97	2.24	2.87	3.15	2.77	1.92	[a] 2.91	2.31	2.34	2.25	2.76
Grand Haven.....	W.	......	3.78	4.70	4.77	4.87	4.67	5.14	3.67	3.97	4.08	1.91	1.94	3.18	2.40
Thornville........	B. & E.	3.35^{26}	4.88	6.60	7.04	5.79	4.84	[a] 3.73	4.04	2.53	3.31	3.21	4.95	5.61	6.95
Lansing, S. B. of H..........	C.	2.89^{24}	2.09	1.64	2.54	2.63	2.97	3.25	3.47	2.30	2.95	1.04	1.40	.41	.48
Ann Arbor.......	S. C.	2.80^{10}	2.76	[a] 1.97	[e] 1.64	[c] 3.18	2.80	[a] 3.93	[d] 4.51	3.98	4.02	2.94	1.24	1.35	[b] 1.57
Birmingham......	S. E.	......	‖	1.83	1.36	1.79	1.27	.....	1.17	.98	.....	.....	.....	.....	.....

---

* At the stations of the U. S. Weather Bureau during the year 1902, the observations were made by exposing the test-paper from 8 A. M. to 8 P. M., all 75th Meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table XIV.

† The names of observers, their places of observation and the counties in which these places are situated, are stated in Table I. The full names of the division and counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Allowance made for difference in sensitiveness of test-paper; explained below. "1."

§ Numbers in this column state the average annual relative amount of ozone by day for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the average denote the number of years included in the average.

¶ This line is an average for only the stations from which statements complete, or nearly complete, were received for every month in the year. It does not include Grand Haven and Birmingham.

‖ The average for 6 months is 1.40.

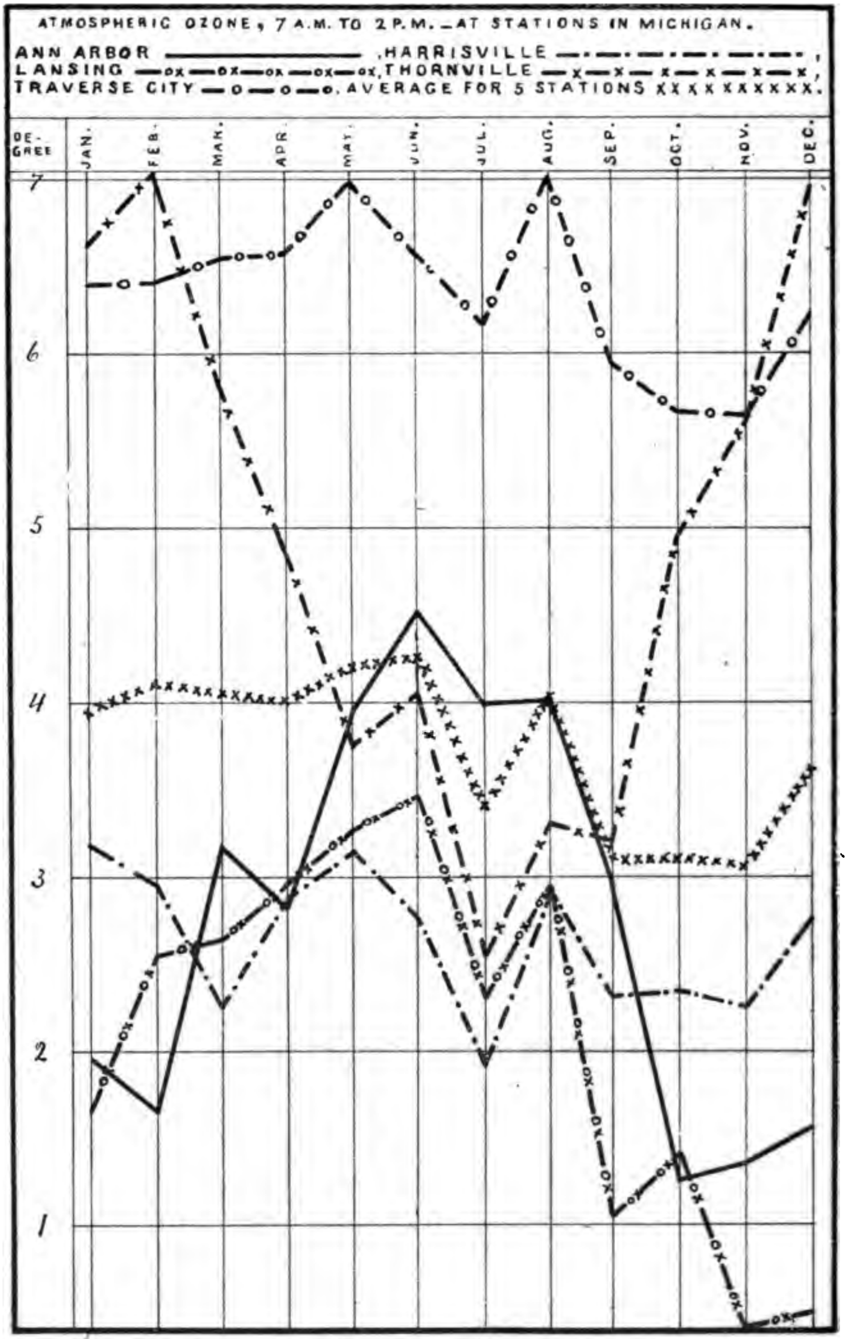
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b for 29 days. c For 28 days. d For 25 days. e For 24 days. f For 16 days.

1 Concerning Ozone Corrections.—It is now believed that the correction (for variation in sensitiveness of different lots of test-paper) applied to the monthly averages in the tables for the day and the night ozone, for the month of November in each of the years 1891, 1892 and 1893, at stations in Michigan and at Lansing, was .39 too great for the day (7 A. M. to 2 P. M.) and .54 for the night ozone (9 P. M. to 7 A. M.). This should be taken into consideration in studying the tables relative to ozone in the annual reports of this board for those years.

Six lines in this table are represented in Diagram VIII.

DIAGRAM VIII.—OZONE, AV. BY DAY, MONTHS IN 1902.



[PLATE 1170]

TABLE XXIX.—*Relative amount of ozone in the atmosphere at night for months and year 1902, at 7 stations, also average line for 5 stations in Michigan—as indicated by averages of observations made nightly by exposing test-paper, prepared according to Schonbein's formula, from 9 P. M. to 7 A. M.—Recorded according to a scale of 10 degrees of coloration of the test-paper (greatest coloration by ozone equals 10) by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in italics.)	Divisions of the State.‡	Degrees of coloration of test-paper.—Night observations.§													
		Year.		Months, 1902.											
		Norm. ¶	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 5 stations‖	....	......	4.04	3.76	4.42	4.36	4.54	4.76	4.63	3.82	3.80	3.22	3.53	3.50	4.21
Traverse City.....	N. W.	5.37^{21}	6.17	6.02	6.04	6.38	6.60	d 7.00	6.38	6.35	e 6.89	5.34	a 5.13	5.60	c 6.34
Harrisville........	N. E.	3.88^{18}	3.13	2.96	3.58	2.79	3.37	3.51	3.11	2.77	a 3.23	2.51	3.14	2.90	3.67
Grand Haven.....	W.	......	5.06	5.41	5.78	5.94	5.77	6.37	5.31	5.41	5.73	3.81	3.50	4.23	3.50
Thornville........	B. & E.	4.24^{26}	6.09	6.92	8.29	7.28	6.77	5.99	5.94	4.67	3.91	3.94	5.65	6.06	7.64
Lansing, S. B. of H..........	C.	3.22^{24}	2.21	1.28	1.95	2.21	2.87	4.06	4.11	2.45	2.36	1.51	1.33	.73	1.60
Ann Arbor.......	S. C.	2.64^{10}	2.63	b 1.62	2.26	c 3.12	3.07	d 3.23	d 3.59	2.84	2.62	2.78	2.40	2.20	b 1.80
Birmingham......	S. E.	......	**	2.28	3.04	2.57	2.04	.....	1.81	1.74	.....	.....	.....	.....	.....

* At the U. S. Weather Bureau Stations during the year 1902 the observations were made by exposing the test-paper from 8 P. M. to 8 A. M., 75th Meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table XIV.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

‡ The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

§ Allowance has been made for difference in sensitiveness in test-paper; explained in foot-note "1," Table VIII.

¶ Numbers in this column state the average annual relative amount of ozone by night for periods of years ending in each case with December 31, 1902. The small figures above and at the right of the numbers which state the average denote the number of years included in the average.

‖ This line is an average for only the stations from which statements, complete, or nearly complete, were received for every month in the year. It does not include Grand Haven and Birmingham.

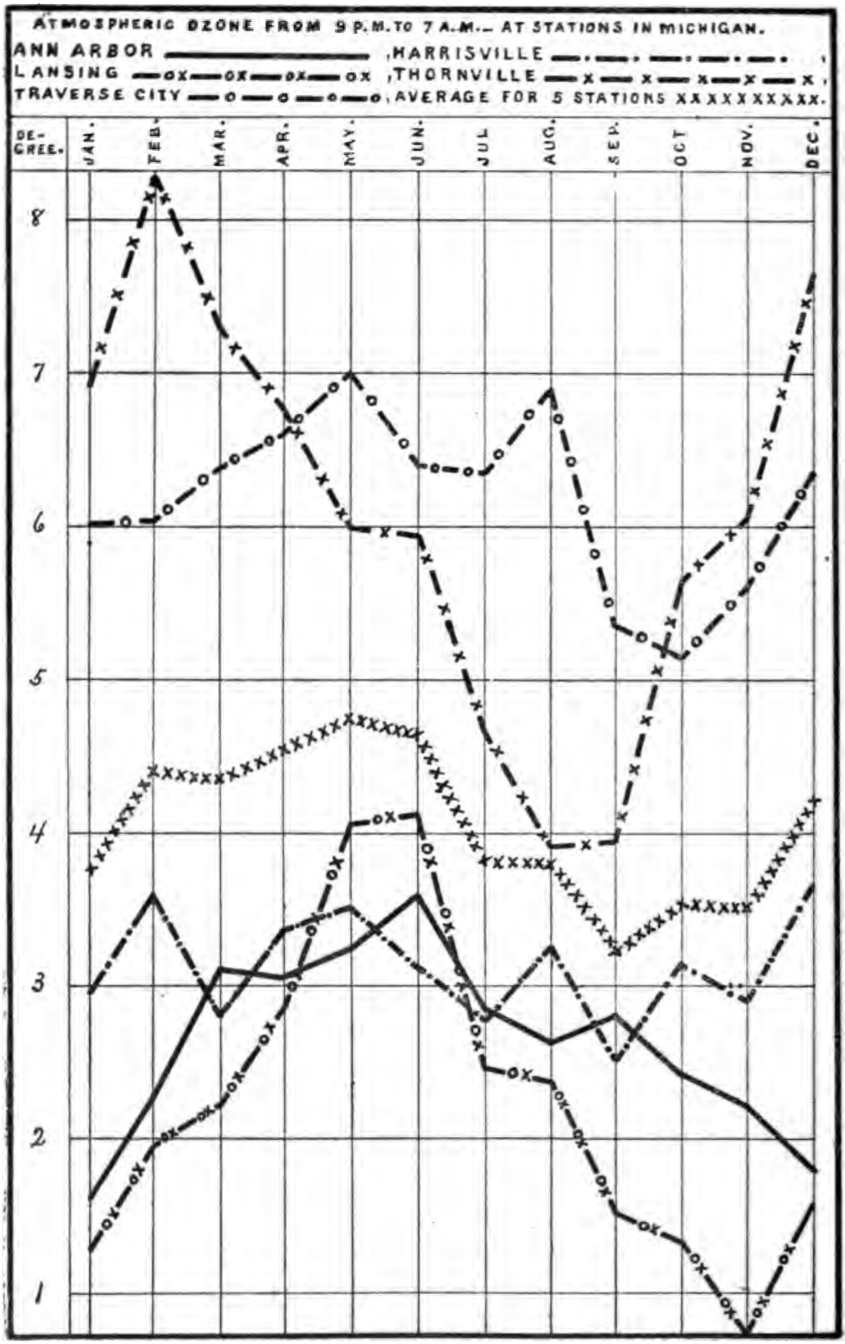
** The average for 6 months is 2.25.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 16 days.

Six lines in this table are graphically represented in Diagram IX.

DIAGRAM IX.—OZONE, AV. BY NIGHT, MONTHS IN 1902.



[PLATE 1171]

TABLE XXX.—*Average amount of atmospheric ozone (day), by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Ozone by day.—Degrees of coloration of test-paper.†												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 yrs., 1877-1901	3.48	3.72	3.82	3.89	3.61	3.77	3.50	3.03	3.51	3.09	3.12	3.19	3.46
1901 (7 stations)....	3.89	3.96	4.14	4.45	3.79	4.50	4.29	3.90	4.62	3.39	3.18	3.29	3.20
1902 (5 stations)....	3.74	3.95	4.12	4.07	4.01	4.21	4.27	3.38	4.04	3.09	3.12	3.05	3·60
In 1902 greater than av. for 25 years, 1877-1901..	.26	.23	.30	.18	.40	.44	.77	.35	.53	0	0	......	.14
In 1902 less than av. for 25 years, 1877-1901.........	....	......	.....	......	......	......	......	......	......	......	......	.14	......
In 1902 greater than in 1901......	....	......	......	......	.22	......	......	......	......	......	......	......	.40
In 1902 less than in 1901............	.15	.01	.02	.38	......	.29	.02	.52	.58	.30	.06	.24	......

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* At from 6 to 20 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 58, report for 1898.

† In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

TABLE XXXI.—*Average amount of atmospheric ozone (night), by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Ozone by night.—Degrees of coloration of test-paper.†												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 yrs., 1877-1901	3.71	3.95	4.31	4.34	4.03	4.07	3.78	3.16	3.43	3.04	3.27	3.45	3.86
1901 (7 stations)....	4.38	4.35	4.41	4.98	4.25	5.27	4.99	4.48	4.92	3.73	3.65	3.61	3.85
1902 (5 stations)....	4.04	3.76	4.42	4.36	4.54	4.76	4.63	3.82	3.80	3.22	3.53	3.50	4.21
In 1902 greater than av. for 25 years, 1877-1901..	.33	......	.11	.02	.51	.69	.85	.66	.37	.18	.26	.05	.35
In 1902 less than av. for 25 years, 1877-1901.........	....	.19	......	......	......	......	......	......	......	......	......	......	......
In 1902 greater than in 1901......	....	......	.01	......	.29	......	......	......	......	......	......	......	.36
In 1902 less than in 1901............	.34	.62	......	.62	......	.51	.36	.66	1.12	.51	.12	.11	......

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* At from 6 to 20 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 58, report for 1898.

† In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

Observations for Ozone at Lansing.—Since July 1, 1884, the observations for ozone at Lansing have been taken at the new shelter for meteorological instruments in the southwest part of the Capitol yard. Previous to July 1, 1884, the observations had been taken at the office window. Exhibit E, page 60, of the report for 1885, shows that the average for the month of July, 1884, is greater at each observation—7 A. M. to 2 P. M., 2 P. M. to 9 P. M., and 9 P. M. to 7 A. M., at the shelter for instruments than at the office window. Possibly this fact should be taken into consideration in studying ozone at Lansing through a long period of years.

TABLE XXXII.—*Average velocity of the wind in miles per hour, by year and months in 1902, compared with annual and monthly averages for 1901, and for the 20 years, 1882-1901.* From registers of the Robinson self-registering anemometer.† These averages are for groups of several stations in Michigan.*

Years, etc.	Average miles per hour.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 20 yrs., 1882-1901	9.7	10.9	10.8	11.0	10.3	9.5	8.0	7.9	7.6	8.8	9.6	10.9	11.0
1901 (8 stations)....	10.3	12.0	11.0	13.3	10.2	9.3	8.3	8.8	7.6	9.6	11.0	11.9	10.1
1902 (8 stations)....	10.7	11.9	10.7	11.8	12.2	10.0	10.3	8.2	7.8	9.5	11.1	11.6	12.9
In 1902 greater than av. for 20 years, 1882-1901..	1.0	1.0	......	.8	1.9	.5	2.3	.3	.2	.7	1.5	.7	1.9
In 1902 less than av. for 20 years, 1882-1901..........	....	......	.1	......	......	......	......	......	......	......	......	......	......
In 1902 greater than in 1901......	.4	......	......	......	2.0	.7	2.0	......	.2	......	.1	......	2.8
In 1902 less than in 1901............	....	.1	.3	1.5	......	......	......	.6	......	.1	......	.3	......

* At from 6 to 9 stations per year for the 20 years, 1882-1901.
† Gibbon's anemometer was used at Ann Arbor.

TABLE XXXIII.—*Average velocity of the wind in miles per hour, by months for the 22 years, 1880-1901, and comparisons of 1901 with this average and with the year 1902. From registers of the Robinson self-registering anemometer in the office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Miles, by self-registering anemometer.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 22 yrs., 1880-1901	9.7	11.0	11.4	11.4	10.8	9.5	8.3	7.8	7.2	8.4	8.9	10.9	11.1
1901................	9.2	9.9	11.0	12.3	8.2	7.9	8.2	7.8	6.2	8.2	10.0	11.5	9.1
1902................	9.8	11.0	10.2	10.9	11.5	9.6	9.8	7.8	6.3	7.9	10.0	10.6	11.7
In 1902 greater than av. for 22 years, 1880-1901..	.1	0	.....	......	.7	.1	1.5	0	......	......	1.1	......	.6
In 1902 less than av. for 22 years, 1880-1901..........	....	......	1.2	.5	.....	......	......	......	.9	.5	......	.3	......
In 1902 greater than in 1901......	.6	1.1	......	......	3.3	1.7	1.6	0	.1	......	0	......	2.6
In 1902 less than in 1901............	....	......	.8	1.4	.....	......	......	......	......	.3	......	.9	......

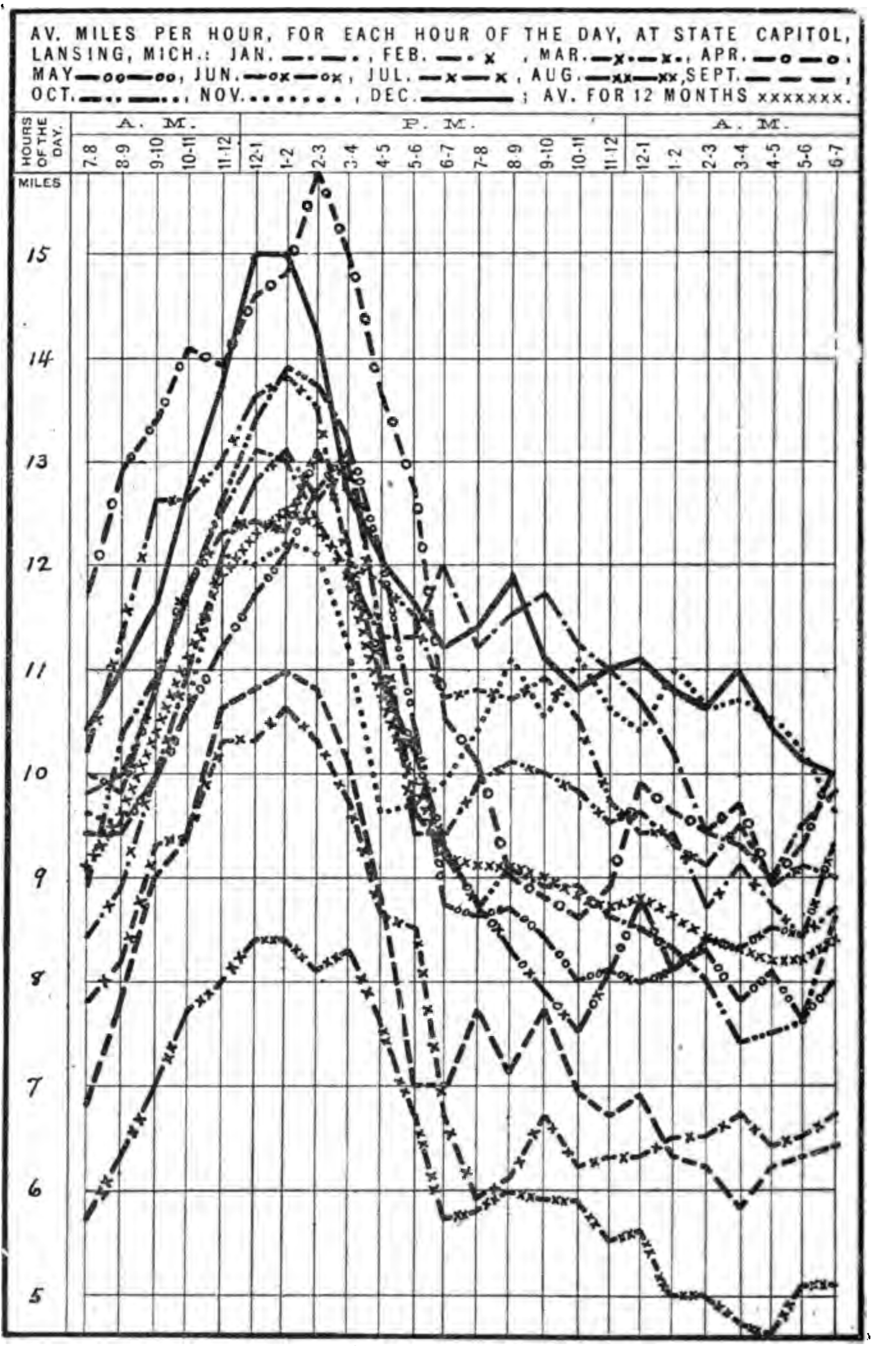
TABLE XXXIV.—*Average velocity of the wind in miles per hour for each hour of the day, by months of the year 1902. Compiled from registers of the Robinson self-registering anemometer, exposed above the roof of the Capitol, and registering in the office of the State Board of Health, Lansing, Michigan.*

Months.	Averages.			Hours (1902) and average miles per hour.																							
	Av. 23 years, 1880-1902.	1901.	1902.	A. M.					P. M.												A. M.						
				7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7
Year	9.7	9.2	9.8	9.1	9.6	10.4	11.1	11.9	12.3	12.5	12.4	11.9	10.7	9.9	9.2	9.1	9.1	9.0	8.8	8.7	8.8	8.6	8.4	8.3	8.2	8.2	8.4
January	11.0	9.9	11.0	*9.8	10.0	10.8	11.8	12.5	13.1	13.0	12.4	11.9	11.3	11.3	12.0	11.2	11.5	11.7	11.2	11.0	10.7	10.2	9.4	9.3	9.0	9.5	9.8
February	11.4	11.0	10.2	†8.4	8.9	10.0	11.0	12.1	12.8	13.1	12.6	13.0	11.3	9.4	9.4	9.9	10.1	10.0	9.8	9.5	9.6	9.3	9.1	9.5	8.9	9.1	9.0
March	11.3	12.3	10.9	*10.2	11.3	12.6	12.6	13.0	13.6	13.8	13.5	12.0	11.8	11.5	10.7	10.8	10.7	10.9	10.5	9.7	9.4	9.4	8.7	9.1	8.7	8.4	8.7
April	10.8	8.2	11.5	‡11.7	12.9	13.4	14.1	13.9	14.6	14.8	15.8	15.0	13.6	12.7	10.5	10.1	9.0	8.8	8.6	8.9	9.9	9.6	9.4	9.7	9.0	9.3	10.0
May	9.5	7.9	9.6	*9.4	9.4	9.9	10.6	11.2	11.7	12.1	12.7	13.1	12.1	10.4	8.7	8.6	8.7	8.4	8.0	8.1	8.8	8.1	8.3	7.8	8.1	7.6	8.0
June	8.3	8.2	9.8	§10.0	9.8	10.8	11.7	12.3	12.4	12.3	13.1	12.2	10.9	10.2	9.3	8.7	8.3	7.9	7.5	8.1	8.0	8.1	8.4	8.3	8.5	8.4	9.3
July	7.8	7.8	7.8	¶7.8	8.2	9.3	9.4	10.3	10.3	10.6	10.3	9.7	8.6	8.5	6.7	5.9	6.1	6.7	6.2	6.3	6.3	6.5	6.5	6.7	6.4	6.5	6.7
August	7.1	6.2	6.3	*5.7	6.3	7.0	7.7	8.0	8.4	8.4	8.1	8.3	7.6	6.7	5.7	5.8	6.0	5.9	5.9	5.5	5.6	5.0	5.0	4.7	4.6	5.1	5.1
September	8.4	8.2	7.9	6.8	7.8	9.0	9.4	10.6	10.8	11.0	10.8	10.1	8.8	7.0	7.0	7.7	7.1	7.7	6.9	6.7	6.9	6.3	6.2	5.8	6.2	6.3	6.4
October	9.0	10.0	10.0	*8.9	10.4	10.9	11.7	12.6	13.4	13.9	13.7	13.2	11.2	9.6	9.2	8.7	9.1	8.9	8.9	8.6	8.5	8.3	8.0	7.4	7.5	7.6	8.6
November	10.9	11.5	10.6	‖9.6	9.5	9.9	10.6	12.1	12.0	12.2	12.1	11.2	9.6	9.7	9.9	10.4	11.1	10.5	11.1	10.6	10.4	11.0	10.6	10.7	10.5	10.2	9.6
December	11.1	9.1	11.7	§10.4	11.0	11.6	12.7	13.7	15.0	15.0	14.2	12.7	12.0	11.6	11.2	11.4	11.9	11.1	10.8	11.0	11.1	10.8	10.6	11.0	10.4	10.1	10.0

* For only about 30 days. † For only about 26 days. ‡ For only about 25 days. § For only about 29 days. ¶ For only about 28 days. ‖ For only about 27 days.

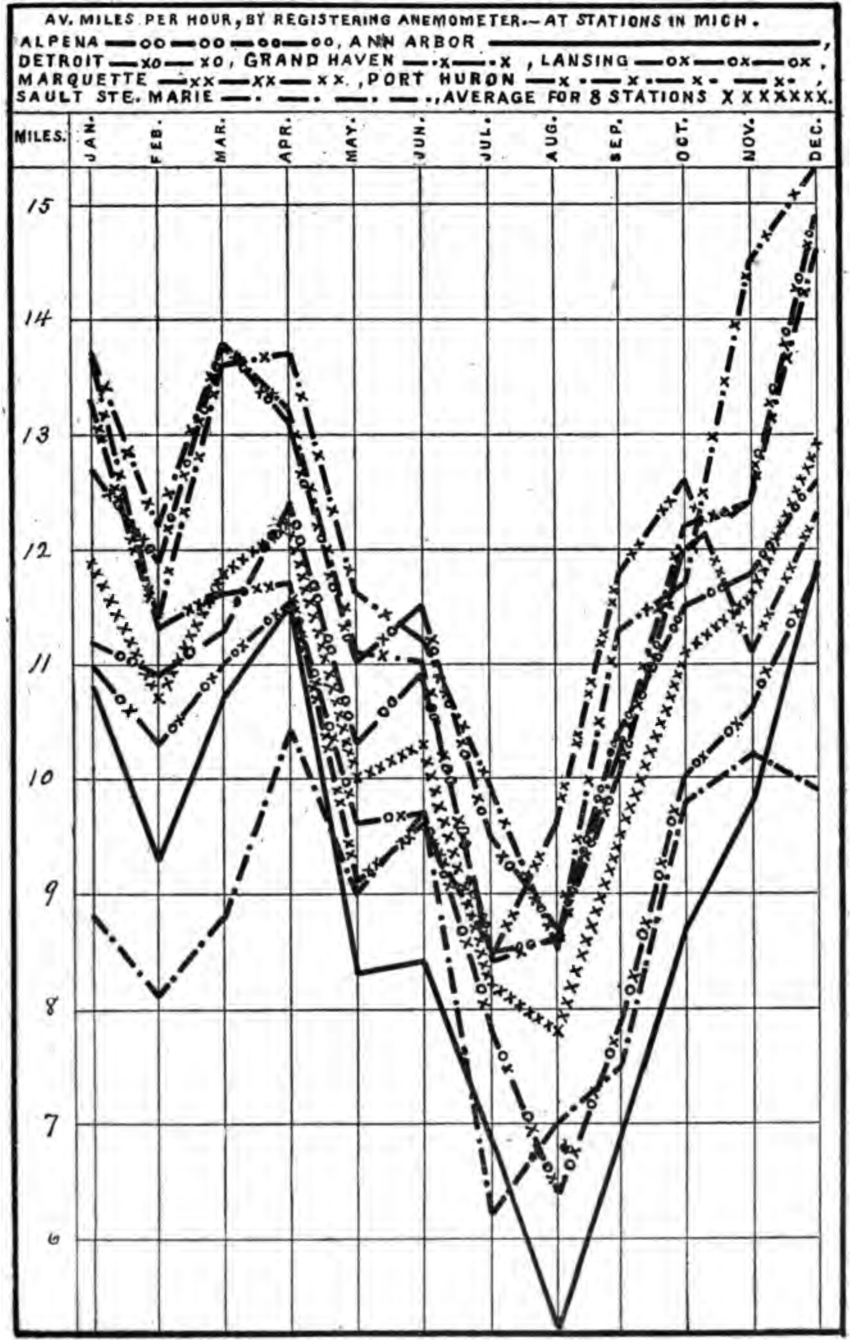
The statements in the third figure column in Table XXXIV, of the average velocity of the wind in miles per hour, by months, during the year 1902, are graphically represented in Diagram XI. The remaining columns of Table XXXIV, for 1902, are graphically represented in Diagram X.

DIAGRAM X.—VELOCITY OF WIND, BY HOURS AND MONTHS, 19



[PLATE 1172]

DIAGRAM XI.--VELOCITY OF WIND, BY MONTHS, 1902.



[PLATE 1173]

TABLE XXXV.—*Average velocity of the wind in miles per hour for the year and for each month of the year 1902, at 8 stations in Michigan; also average for 8 stations. Computed from registers of the Robinson self-registering anemometer,* by observers for the State Board of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.†	Divisions of the State.	Miles, by self-registering anemometer.													
		Year.		Months, 1902.											
		Norm. ‡	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 8 stations	....	......	10.7	11.9	10.7	11.8	12.2	10.0	10.3	8.2	7.8	9.5	11.1	11.6	12.9
Marquette........	U. P.	9.8^{17}	11.0	13.3	11.3	11.6	11.7	9.1	9.6	8.5	9.6	11.8	12.6	11.1	12.3
Sault Ste. Marie.	U. P.	8.6^{11}	8.8	8.8	8.1	8.8	10.4	9.0	9.7	6.2	7.0	7.5	9.8	10.2	9.9
Alpena............	N. E.	10.0^{4}	10.9	11.2	10.9	11.3	12.4	10.3	10.9	8.4	8.6	10.4	11.5	11.8	12.6
Grand Haven....	W.	12.0^{2}	12.2	13.7	11.4	13.6	13.7	11.6	11.2	9.9	8.5	11.3	11.7	14.5	15.3
Port Huron......	B. & E.	10.8^{21}	11.8	13.7	12.2	13.8	13.2	11.1	11.0	8.4	8.6	10.2	12.2	12.4	14.6
Lansing, S. B. of H...........	C.	9.7^{23}	9.8	11.0	10.3	11.0	11.5	9.6	9.7	7.8	6.4	7.9	10.0	10.6	11.8
Ann Arbor.......	S. C.	8.3^{7}	9.0	10.8	9.3	10.7	11.5	8.3	8.4	6.8	5.2	6.9	8.7	9.8	11.9
Detroit...........	S. E.	10.1^{21}	11.8	12.7	11.9	13.8	13.1	11.0	11.5	9.5	8.6	10.0	12.0	12.4	14.9

* Gibbon's anemometer was used at Ann Arbor.

† The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

‡ Numbers in this column state the average velocity of the wind in miles per hour for periods of years ending in each case with December 31, 1902. The small figures above and at the right of numbers which state the average denote the number of years included in the average.

Graphic representations of statements made in Table XXXV are given in Diagram XI.

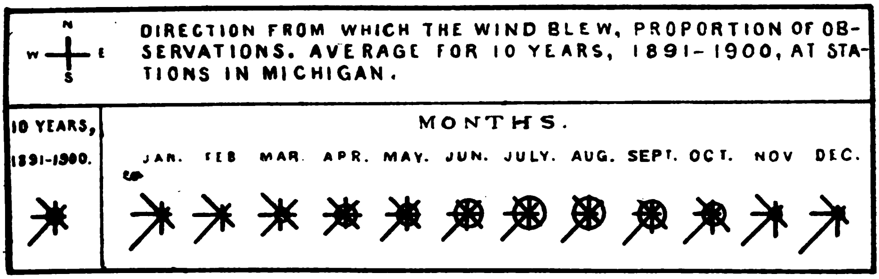
TABLE XXXVI.—DIRECTION OF WIND, 1891-1900.—*Number of observations per month (made tri-daily), at which the wind was blowing from the several (eight) points of compass.—Annual and monthly averages for the 10 years, 1891-1900, at stations in Michigan.**

Points of compass.	Average number of observations per month.—10 years, 1891-1900.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations..	90	92	84	92	89	91	88	91	91	89	92	89	92
Calm................	5	3	2	4	5	6	7	8	8	7	6	3	3
North...............	7	6	5	8	9	9	6	8	9	7	7	6	4
Northeast..........	8	5	7	11	11	10	9	7	9	7	6	6	5
East................	6	5	5	8	9	7	7	5	5	5	4	3	3
Southeast..........	9	9	8	11	11	10	10	8	8	10	12	9	7
South.	10	10	8	8	7	9	8	8	9	10	11	12	12
Southwest.........	21	25	20	16	15	19	20	21	21	22	22	24	29
West...............	12	16	15	12	11	11	11	13	9	10	11	13	15
Northwest.........	13	15	14	15	12	12	9	12	13	12	13	14	13

* At 11 stations in 1891; 11 in 1892; 8 in 1893; 10 in 1894; 9 in 1895; 10 in 1896; 9 in 1897; 8 in 1898; 9 in 1899; 8 in 1900.

Graphic representations of statements made in Table XXXVI, are given in Diagram XIII.

DIAGRAM XIII.—WIND, DIRECTION, IN MICH., AVERAGE 10 YEARS, 1891–1900.



[PLATE 1130]

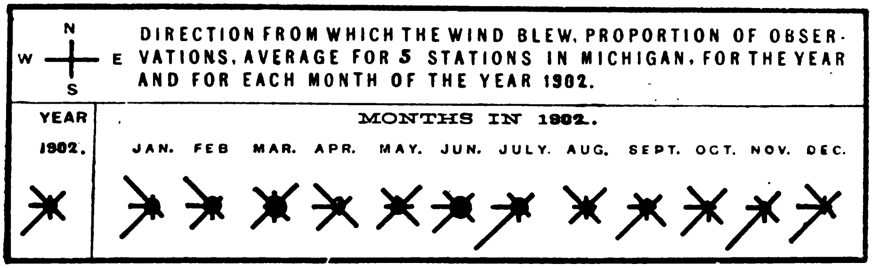
TABLE XXXVII.—*Number of observations per month (at 7 A. M., 2 P. M. and 9 P. M., daily), at which the wind was blowing from each of the 8 principal points of compass, during the year and during each month of the year 1902. Average for 5 stations in Michigan.**

Points of compass.	Average number of observations per month, 1902.												
	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations (5 stations)....	90	93	84	93	90	92	90	93	85	90	93	90	92
Calm..............	3	4	3	5	3	3	5	4	3	3	2	1	1
North........	5	6	3	9	6	6	5	2	6	5	3	3	6
Northeast.........	11	4	7	17	8	17	10	10	15	10	14	12	12
East...............	4	2	1	4	1	9	5	3	4	5	4	3	4
Southeast.........	11	8	9	11	15	16	10	8	11	14	11	10	8
South..............	7	7	8	8	4	4	5	8	6	7	8	9	4
Southwest	22	24	17	18	18	17	21	33	13	25	21	32	27
West	12	14	14	7	16	7	16	15	8	11	14	11	15
Northwest	15	23	22	15	19	13	13	10	17	10	16	8	16

* The names of observers, their places of observation, and the counties and divisions of the State in which those places are situated are stated in Table I.

Graphic representations of statements in Table XXXVII are given in Diagram XIV.

DIAGRAM XIV.—WIND, DIRECTION, IN MICH., YEAR AND MONTHS, 1902.



[PLATE 1175]

TABLE XXXVIII.—*Average number of observations per month for the year 1902, at which the wind was blowing from each of the 8 principal points of the compass, at each of 5 stations* in Michigan; also the average line for the 5 stations.*

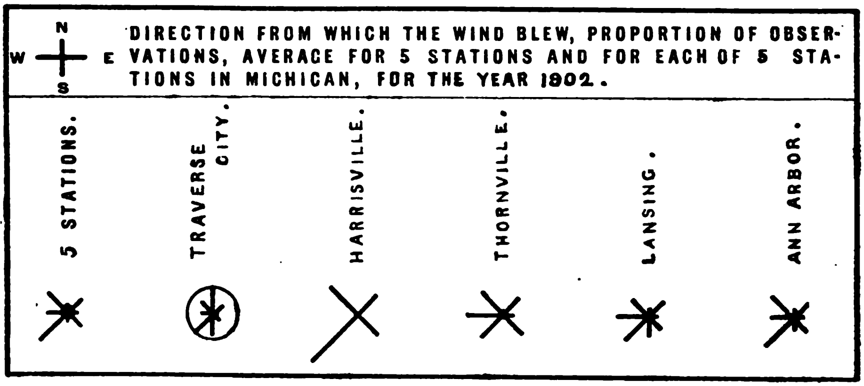
Stations in Michigan.*	Divisions of the State.†	Average number of observations per month, 1902.									
		All obs.	Calms.	N.	N. E.	E.	S. E.	S.	S.W.	W.	N.W.
Average for 5 stations..........	....	90	3	5	11	4	11	6	22	12	15
Traverse City....................	N. W.	87	14	14	7	3	5	13	15	7	9
Harrisville.........................	N. E.	91	0	0	14	0	16	0	37	2	22
Thornville....	B. & E.	91	0	1	13	6	15	2	17	21	16
Lansing, S. B. of H.............	C.	91	0	5	11	5	9	11	19	18	13
Ann Arbor.........................	S. C.	91	1	5	11	5	10	6	23	14	17

* The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

† The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

Graphic representations of statements in Table XXXVIII, are given in Diagram XV.

DIAGRAM XV.—WIND, DIRECTION, AT STATIONS IN MICHIGAN, 1902.



[PLATE 1176]

TABLE XXXIX.—*Number of observations for months and year 1902, at which the wind was blowing from each of the 8 principal points of the compass, at 6 stations* in Michigan; also average line for 5 of the said stations from which complete, or nearly complete observations were received for the year. (Observations were made at 7 A. M., 2 P. M. and 9 P. M. daily.)*

Stations in Michigan.*	Divisions of the State.*	January.										February.										March.									
		Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W
Av. 5 stations†	....	93	4	6	4	2	8	7	24	14	23	84	3	3	7	1	9	8	17	14	22	93	5	9	17	4	11	8	18	7	15
Traverse City	N. W.	93	19	13	0	0	1	20	16	8	16	84	14	8	1	1	5	21	11	7	16	93	22	27	4	2	7	13	10	3	5
Harrisville	N. E.	93	0	0	2	0	7	0	47	1	36	84	0	0	3	0	12	0	28	7	34	93	0	0	27	1	15	0	25	2	23
Thornville	B. & E.	92	0	0	7	4	14	4	20	18	25	84	0	0	13	1	16	0	14	19	21	93	1	0	22	2	19	6	17	10	16
Lansing, S. B. of H.	C.	93	0	4	6	4	10	11	19	20	19	84	0	6	8	3	3	11	17	17	19	93	0	6	16	10	7	12	16	14	12
Ann Arbor	S. C.	93	2	11	5	2	9	2	19	22	21	84	1	3	8	1	9	8	14	22	18	93	0	10	15	4	8	10	20	8	18
Birmingham	S. E.	93	9	4	3	3	2	7	25	35	5	84	6	7	5	3	3	8	3	19	30	93	3	8	9	16	5	10	6	22	14

* Names of observers, etc., are given in Table I. Names of divisions, etc., are given in Exhibit I, in the annual report for 1898 and in preceding reports.

† This line includes the 5 stations from which statements complete, or nearly complete, were received for every month of the year. It does not include Birmingham.

Graphic representations of statements for six lines in this table are given in Diagram XII, which is explained on page 62 of the annual report for 1898, and in preceding reports.

TABLE XXXIX.—CONTINUED.—*Direction of wind, months in 1902.—Observations at which the wind was blowing from direction named.*

Stations in Michigan.*	Divisions of the State.†	April.										May.										June.									
		Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W.	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S. W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S. W	W.	N.W
Av. 5 stations† ..	....	90	3	6	8	1	15	4	18	16	19	92	3	6	17	9	16	4	17	7	13	90	5	5	10	5	10	5	21	16	13
Traverse City...	N. W.	90	13	17	6	2	8	8	13	6	17	86	14	21	9	6	8	11	7	4	6	90	21	21	7	3	4	13	6	9	6
Harrisville.......	N. E.	90	0	0	11	0	28	1	22	5	23	93	0	0	28	0	23	0	20	0	22	90	0	0	13	0	8	0	43	2	24
Thornville.......	B. & E.	90	0	0	12	1	15	0	15	29	18	93	0	0	18	20	15	0	17	12	11	90	0	0	11	8	16	1	11	36	7
Lansing, S. B. of H..........	C.	90	1	6	5	1	14	6	20	18	19	93	0	4	15	8	16	8	20	11	11	90	0	4	9	7	11	6	21	20	12
Ann Arbor......	S. C.	90	0	6	8	3	8	6	19	20	20	93	1	6	13	10	17	2	22	9	13	90	2	2	9	5	11	6	23	15	17
Birmingham. ...	S. E.	90	4	10	8	9	2	5	10	20	22	......	......	....	....	....	....	..	....	....	....	90	11	8	3	6	7	2	8	25	20

*† These foot-notes are at bottom of first page of this table.

Graphic representations of statements for six lines in this table are given in Diagram XII, which is explained on page 62 of the annual report for 1898, and in preceding reports.

TABLE XXXIX.—CONTINUED.—*Direction of wind, months in 1902.—Observations at which the wind was blowing from direction named.*

Stations in Michigan.*	Divisions of the State.*	July.										August.										September.									
		Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W
Av. 5 stations†	....	93	4	2	10	3	8	8	33	15	10	85	3	6	15	4	11	6	13	8	17	90	3	5	10	5	14	7	25	11	10
Traverse City...	N. W.	93	21	5	10	5	5	15	19	8	5	51	13	10	2	2	0	13	3	6	2	90	13	10	13	4	5	8	24	9	4
Harrisville.......	N. E.	93	0	0	14	0	11	0	59	1	8	93	0	0	21	0	22	0	28	1	21	90	0	0	11	1	21	0	42	2	13
Thornville.......	B. & E.	93	0	1	9	8	11	5	27	26	6	93	0	0	30	6	17	2	5	9	24	89	0	0	11	8	21	3	12	19	15
Lansing, S. B. of H..........	C.	93	0	4	9	2	4	13	22	32	7	93	0	13	15	5	8	9	15	15	13	90	0	9	6	5	15	18	13	16	8
Ann Arbor......	S. C.	93	0	1	7	1	8	7	39	8	22	93	0	9	9	9	9	7	15	11	24	90	1	5	9	8	7	8	34	9	9
Birmingham.....	S. E.	93	20	6	4	9	1	0	6	34	13	......	......	....	....	....	....	..	....	....	....	......	......	...	....	....	....	..	....	....	....

*† These foot-notes are at bottom of first page of this table.

Graphic representations of statements for six lines in this table are given in Diagram XII, which is explained on page 62 of the annual report for 1898, and in preceding reports.

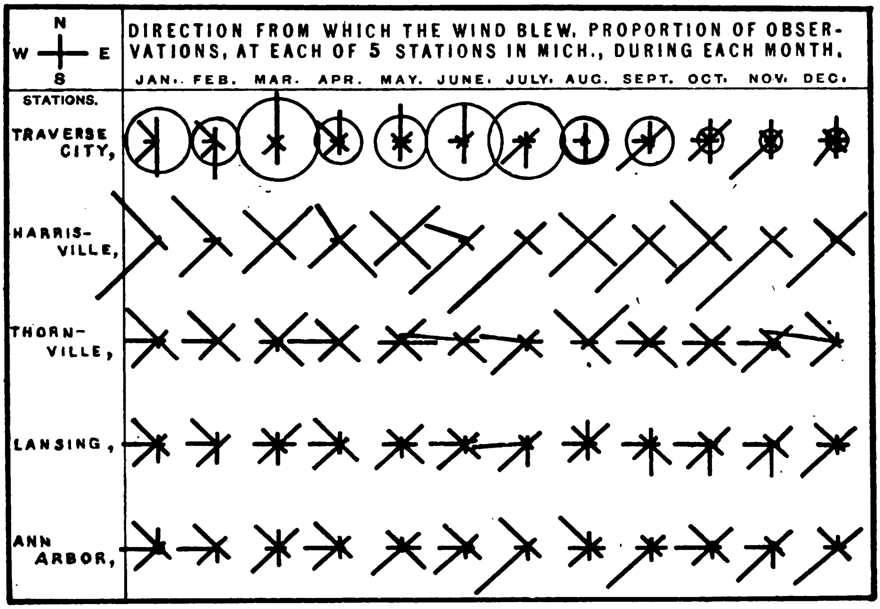
TABLE XXXIX.—CONCLUDED.—*Direction of wind, months in 1902.—Observations at which the wind was blowing from direction named.*

Stations in Michigan.*	Divisions of the State.*	October.										November.										December.									
		Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S. W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W	W.	N.W
Av. 5 stations†	....	93	2	3	14	4	11	8	21	14	16	90	1	3	12	3	10	9	32	11	8	92	1	6	12	4	8	4	27	15	16
Traverse City...	N. W.	92	7	12	16	4	2	13	17	12	9	90	6	11	8	3	7	11	32	4	8	88	6	14	6	8	9	10	17	9	9
Harrisville.......	N. E.	93	0	0	11	0	16	0	34	1	31	90	0	0	10	0	14	0	57	0	9	93	0	0	22	0	12	0	38	4	17
Thornville.......	B. & E.	93	0	1	13	7	19	2	19	17	15	90	0	1	14	4	12	5	24	20	10	93	0	5	0	3	3	0	19	40	23
Lansing. S. B. of H..........	C.	93	0	3	14	3	8	17	18	21	9	90	0	1	14	4	11	18	19	16	7	93	0	5	14	6	6	6	27	12	17
Ann Arbor......	S. C.	93	2	0	15	5	12	7	15	21	16	90	0	3	13	3	8	12	28	16	7	93	0	6	17	4	9	2	32	8	15
Birmingham.....	S. E.	......	......	....	....	....	....	..	....	....	....	......	......	....	....	....	....	..	....	....	....	......	......	....	....	....	....	..	....	....	....

*† These foot-notes are at bottom of first page of this table.

Diagram XII exhibits lines showing, by months, directions of wind at each of five stations in this table; for each month and station the diagram represents the figures given in this table for the same month and stations; it is explained on page 62 of the annual report for 1898, and in preceding reports.

DIAGRAM XII.-WIND, DIRECTION, AT STATIONS, BY MONTHS, IN 1902.



[PLATE 1174]

TABLE XL.—*Average daily range of atmospheric pressure (as determined from three daily observations) for months and year 1902, at 6 stations, also average line for 5 stations* in Michigan—stations arranged in order by latitude, those farthest north first.*

Stations in Michigan.*	Average daily range of barometer.—Year and months, 1902.														
	Norm. †	1901.	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 5 stations‡.	......	......	.196	.263	.206	.208	.225	.168	.177	.115	.123	.155	.250	.207	.254
Traverse City......	.210^{21}	.188	.202	.283	.192	.195	.239	[d] .185	.161	.123	[e] .158	.150	[b] .279	.209	[c] .247
Harrisville..........	.206^{8}	.192	.202	.266	.207	.199	.235	.182	.190	.127	.122	.157	.273	.222	.246
Thornville..........	.208^{19}	.186	.192	.256	.215	.226	.214	.160	.179	.118	.106	.167	.221	.196	.243
Lansing, S. B. of H.	.201^{21}	.178	.191	.257	.207	.205	.225	.154	.175	.100	.114	.153	.235	.203	.259
Birmingham........	......	......	§	[a] .282	.262	.228	[b] .256	.....	.186	[a] .121	.....	.....	.....	.....	.....
Ann Arbor..........	.202^{21}	.186	.193	.254	.210	.214	.214	.158	.181	.108	.114	.147	.240	.205	.273

* The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I. The average atmospheric pressure at each of these stations, by months, in 1902, is given in Table XLIII.

†Numbers in this column state the average daily range of atmospheric pressure for periods of years ending in each case with Dec. 31, 1902. The small figures above and at the right of numbers which state the average daily range denote the number of years included in the average.

‡ Not including Birmingham.

§ The average for 6 months is 223.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 16 days.

NOTE.—The latitude and elevations of some of the stations in Table XL, are stated in Table II.

The daily range is found by subtracting the lowest observation from the highest observation, 7 A. M. to 7 A. M.

TABLE XLI.—*Range of atmospheric pressure (as determined from three daily observations) for the year and for each month and for the average month of the year 1902, at 5 and at each of the 5 stations, and average line for 5 stations in Michigan; also the normal—average monthly range for a series of years. Stations named in order by latitude, those farthest North first.*

Stations in Michigan.	Range of barometer.—Year and months, 1902.															
	Norm. *	1901.	1902.	Av. Month	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
For 5 stations†	......	.....	2.346	1.306	1.505	1.901	1.607	1.442	1.016	1.262	.903	.935	.961	1.300	1.155	1.682
Av. for 5 stations‡..	......	......	1.956	.954	1.187	1.564	1.301	1.087	.638	.825	.540	.570	.690	1.049	.806	1.191
Traverse City	.943^{21}	1.527	2.189	.980	1.298	1.718	1.463	1.259	[d] .694	.766	.580	[e] .542	.618	[b] 1.072	.752	[c] .999
Harrisville....	.897^{8}	1.541	1.819	.943	1.164	1.491	1.203	1.092	.745	.851	.578	.565	.589	1.107	.831	1.100
Thornville....	.925^{19}	1.308	1.903	.965	1.177	1.508	1.366	1.041	.603	.858	.566	.554	.835	1.009	.789	1.278
Lansing. S. B. of H....	.900^{21}	1.415	1.958	.954	1.164	1.589	1.281	1.054	.591	.844	.488	.626	.712	1.051	.768	1.281
Birmingham..	......	......	1.828	§	[a] 1.118	1.582	1.228	1.026	.....	.579	.509	.....	.....	.....	.....	.....
Ann Arbor...	.894^{21}	1.369	1.911	.927	1.131	1.514	1.191	.989	.557	.806	.486	.564	.696	1.006	.892	1.297

* Numbers in this column state the average monthly range of atmospheric pressure for a period of years ending in each case with December 31, 1902. The small figures above and at the right of the numbers which state the average denote the number of years included in the average.

† Represents the difference between the highest of 5 stations and the lowest of 5 stations for year and for each month of year, not including Birmingham.

‡ Represents sum of ranges at 5 stations divided by 5.

§ The average for 6 months is 1.007.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b for 29 days. c For 28 days. d For 27 days. e For 16 days.

NOTE.—The statements in the (*) foot-note to Table XL, apply also to Table XLI.

TABLE XLII.—*Average atmospheric pressure, by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 25 years, 1877-1901.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average atmospheric pressure.—Inches of mercury.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 25 years, 1877-1901..............	29.133	29.144	29.142	29.123	29.130	29.091	29.099	29.113	29.134	29.174	29.161	29.147	29.139
1901 (8 stations)....	29.134	29.109	29.132	28.980	29.240	29.044	29.116	29.122	29.171	29.200	29.198	29.182	29.110
1902 (6 stations)....	29.092	29.180	29.040	29.078	29.041	29.144	28.973	29.086	29.103	29.093	29.134	29.101	29.129
In 1902 greater than av. for 25 years, 1877-1901..	....	.036	......	......	......	.053	......	......	......	......	......	......	......
In 1902 less than av. for 25 years, 1877-1901..........	.041	......	.102	.045	.089	......	.126	.027	.031	.081	.027	.046	.010
In 1902 greater than in 1901......	....	.071	......	.098	......	.100	......	......	......	......	......	......	.019
In 1902 less than in 1901............	.032	......	.092	......	.199	......	.143	.036	.068	.107	.064	.081	......

* At from 7 to 20 stations per year for the 25 years, 1877-1901. Just which stations in each year, up to 1897, are shown on page 75, report for 1898.

TABLE XLIII.—*Average atmospheric pressure for months and year 1902, at each of 7 stations in Michigan; also averages for 6 stations, as indicated by the height, in inches, of Mercury in the barometer. Corrected for temperature. Reduced to 32° F. (for some stations not corrected for instrumental errors*).—Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M. by observers† for the State Board of Health.*

Stations in Michigan.†	Divisions of the State.‡	Inches of Mercury.—Atmospheric pressure.													
		Years.		Months, 1902.											
		Norm.§	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 6 stations¶	....	....	29.097	29.180	29.040	29.078	29.041	29.144	29.029	29.086	29.103	29.093	29.134	29.101	29.129
Traverse City	N. W.	29.320^{21}	29.266	29.384	29.221	29.262	29.210	[b] 29.287	29.196	29.223	[c] 29.240	29.260	[a] 29.303	29.261	[b] 29.345
Harrisville	N. E.	29.320^{8}	29.289	29.363	29.237	29.288	29.217	29.338	29.208	29.277	29.317	29.285	29.296	29.308	29.328
Thornville	B. & E.	28.955^{2}	28.942	28.997	28.857	28.907	28.869	28.975	28.866	28.950	28.966	28.965	28.998	28.965	28.988
Agricultural College	C.	29.076^{21}	29,000	29.120	28.991	29.022	28.994	29.101	28.961	28.955	28.978	28.957	28.985	28.958	28.975
Lansing, S. B. of H	C.	29.064^{24}	29.058	29.128	28.988	29.015	29.002	29.099	28.989	29.076	29.080	29.062	29.095	29.072	29.088
Ann Arbor	S. C.	29.033^{22}	29.023	29.086	28.945	28.973	28.951	29.061	28.951	29.034	29.035	29.026	29.128	29.041	29.050
Birmingham	S. E.	....	[‖]	[a] 29.172	29.073	29.095	29.052	....	20.060	29.142	....	....	....	....	....

* A correction has been made for instrumental error of barometer at Ann Arbor; .004 has been added to each monthly average during the year 1902. At the Agricultural College, —.013 has been subtracted from each monthly average. For other stations the instrumental error of barometer is not known.

† The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

‡ The full names of divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

§ Numbers in this column state the average annual atmospheric pressure for periods of years ending in each case with December 31, 1902. The small figures at the right of the numbers which state the average denote the number of years included in the average.

¶ This line is an average for six stations, at which observations, nearly complete, were received for every month in the year. It does not include Birmingham. Green's standard barometer was used at all the 7 stations for 1902.

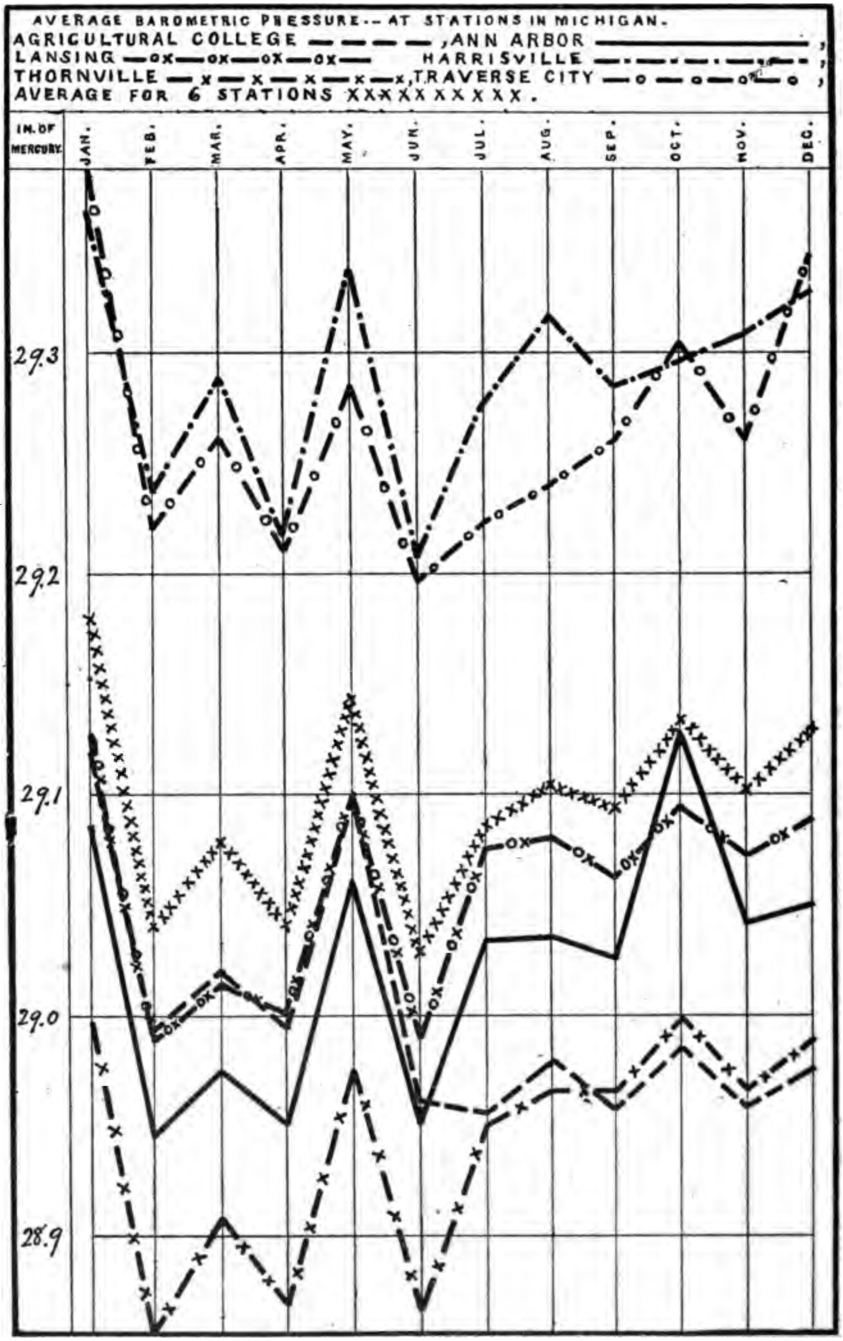
‖ The average for 6 months is 29.099.

NOTE.—Computations of monthly averages for the year 1902 were furnished by the observers at Ann Arbor and the Agricultural College. The remainder of the computations were made at the office of the State Board of Health.

a For 30 days b For 28 days. c For 16 days.

The average line and lines for six stations in this table are graphically represented in Diagram XVI.

DIAGRAM XVI.—ATMOSPHERIC PRESSURE, BY MONTHS, 1902.



[PLATE 1177]

TABLE XLIV.—*Average daily range of atmospheric pressure, by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 20 years, 1882-1901.*[*] *These averages are for groups of several stations in Michigan.*

Years, etc.	Average daily range of barometer.—Year and months, 1902.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 20 yrs., 1882-1901	.207	.297	.287	.264	.207	.164	.136	.124	.127	.169	.200	.246	.261
1901 (7 stations)	.177	.280	.194	.229	.173	.159	.101	.103	.097	.159	.187	.215	.229
1902 (5 stations)	.196	.263	.206	.208	.225	.168	.177	.115	.123	.155	.250	.207	.254
In 1902 greater than av. for 20 years, 1882-1901	......	......	......	......	.018	.004	.041	......	......	......	.050	......	......
In 1902 less than av. for 20 years, 1882-1901	.011	.034	.081	.056	......	......	......	.009	.004	.014	......	.039	.007
In 1902 greater than in 1901	.019	......	.012	......	.052	.009	.076	.012	.026	......	.063	......	.025
In 1902 less than in 1901	......	.017	......	.021	......	......	......	......	......	.004	......	.008	......

[*] At from 7 to 18 stations per year for the twenty years, 1882-1901. Just which stations in each year, up to 1897, are shown on page 78, report for 1898.

TABLE XLV.—*Range of atmospheric pressure, by year and months, in 1902, compared with annual and monthly averages for 1901, and for the 20 years, 1882-1901.*[*] *These averages are for groups of several stations in Michigan.*

Years, etc.	Range of barometer.—Year and months, 1902.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 20 yrs., 1882-1901	.929	1.257	1.244	1.160	1.000	.776	.679	.570	.587	.796	.964	1.085	1.110
1901 (6 stations)	.810	1.316	.883	.931	.968	.798	.502	.490	.438	.742	1.006	.928	.883
1902 (5 stations)	.954	1.187	1.564	1.301	1.087	.638	.825	.540	.570	.690	1.049	.808	1.191
In 1902 greater than av. for 20 years, 1882-1901	.025	......	.320	.141	.087	......	.146	......	......	......	.085	......	.081
In 1902 less than av. for 20 years, 1882-1901	......	.070	......	......	......	.138	......	.030	.017	.106	......	.277	......
In 1902 greater than in 1901	.144	......	.681	.370	.119	......	.323	.050	.132	......	.043	......	.308
In 1902 less than in 1901	......	.129	......	......	......	.160	......	......	......	.052	......	.120	......

[*] At from 6 to 18 stations per year for the twenty years, 1882-1901. Just which stations in each year, up to 1897, are shown on page 78, report for 1898.

Sunshine and clouds.—On the back of each blank register supplied by this Board to observers, on which they are to register meteorological data, is a statement that "One observer has reported a record of days 'all or nearly all cloudy' and days 'all or nearly all sunshine.' The State Board of Health would be glad to have such a report from all observers who can conveniently make it. Memoranda may be made in a column headed 'cloudy or sunny,' days more than eighty per cent of clouds being marked with the abbreviation 'C,' indicating *cloudy,* and days with less than 20 per cent of clouds with an 'S,' indicating *sunshine.*"

TABLE XLVI.—*Statements of the number of days in each month which were reported "sunny," "partly cloudy," and "cloudy," by observers at stations in Michigan.*

Stations in Michigan.	1902.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Marquette.......	S.	5	2	8	6	2	4	10	......	5	5	2	2
	P. C.	4	11	8	11	16	16	13	......	14	7	6	8
	C.	22	15	15	13	13	10	8	......	11	19	22	21
Sault Ste. Marie	S.	6	10	15	7	11	9	7	15	6	8	3	2
	P. C.	4	6	4	10	14	12	16	8	9	6	5	5
	C.	21	12	12	13	6	9	8	8	15	17	22	24
Traverse City...	S.	2	7	14	11	......	12	9	8	5	9	4	2
	P. C.	6	7	4	6	......	5	13	19	10	10	2	3
	C.	23	14	13	13	......	13	9	4	15	12	24	25
Alpena..........	S.	4	6	14	8	8	5	9	13	5	8	3	3
	P. C.	7	8	6	7	10	13	11	10	6	9	7	3
	C.	20	14	11	15	13	12	11	8	19	14	20	25
Grand Haven....	S.	4	8	10	10	12	8	9	11	7	9	2	2
	P. C.	8	5	7	11	13	12	14	15	10	8	10	5
	C.	19	15	14	9	6	10	8	5	13	14	18	24
Port Huron......	S.	4	11	10	7	7	4	8	18	6	12	8	5
	P. C.	14	8	8	8	15	12	14	9	10	3	8	5
	C.	13	9	13	15	9	14	9	4	14	16	14	21
Thornville.......	S.	8	13	10	11	12	6	11	20	10	12	12	2
	P. C.	9	6	7	7	12	11	13	4	6	5	5	5
	C.	14	9	14	12	7	13	7	7	14	14	13	24
Lansing..........	S.	6	9	12	10	9	8	11	12	9	15	8	5
	P. C.	7	3	7	2	7	6	6	3	4	2	4	0
	C.	18	16	12	18	15	16	14	16	17	14	18	26
Ann Arbor......	S.	3	6	6	10	8	7	14	16	8	14	7	6
	P. C.	15	8	13	6	18	11	9	9	11	8	9	5
	C.	13	14	12	14	5	12	8	6	11	9	14	20
Detroit..........	S.	7	5	8	10	12	5	13	15	10	10	7	2
	P. C.	13	8	10	5	13	16	11	11	8	10	8	8
	C.	11	15	13	15	6	9	7	5	12	11	15	21

THE TIME OF GREATEST PREVALENCE OF EACH DISEASE.

CONTRIBUTIONS TO THE STUDY OF THE CAUSES OF SICKNESS.

A STATISTICAL REPORT BASED ON WEEKLY POSTAL-CARD REPORTS OF SICKNESS IN MICHIGAN DURING THE YEAR 1902, AND COMPARISONS WITH PRECEDING YEARS.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper is the twenty-sixth in a series of articles upon the same general subject begun in the latter part of 1876. It presents a summary of the compilation of weekly reports of sickness in Michigan in 1902. It includes a series of graphic illustrations which show by months, in 1902, the rise and fall of twenty-eight of the most prominent diseases in Michigan.

The weekly reports of sickness, upon which this article is based, are made by representative physicians in active, general, practice; and an effort is made to obtain such reports from all parts of the State, so that they shall correctly represent the sickness which occurs.

One of the objects of this compilation is to learn the time of the greatest and of the least prevalence of each of the important diseases in the State, and the relative prevalence in each month, and to note the connection of this prevalence with each of the meteorological conditions in the State.

Tables are given showing the per cent of the weekly *reports* and the per cent of *observers* which stated the presence of the various diseases; and by comparing Table 1 with Table 4, we see the correspondence in the two lines of evidence,—that of the "prevalence" of the diseases as shown by the per cent of *reports,* and the "area of prevalence" as shown by the per cent of *observers*, the diseases following each other in a somewhat similar order from highest to lowest—the diseases being arranged in each table in the order of their greatest reported prevalence in 1902.

For purposes of comparison of the sickness from the several diseases in the year under consideration with that in preceding years, some of the tables exhibit the facts relative to the sickness in Michigan from each of the important diseases in each of several preceding years, and some of the tables permit of quantitative comparisons of the latest year with the averages of the ten preceding years.

Propositions are stated as to the relations of specified meteorological conditions, and diseases are mentioned under these propositions in such manner as to suggest one method of studying some of the facts brought out in the compilation. Casual observation shows that certain diseases are much more prevalent than at the average time in the hot months, while certain other diseases are much more prevalent in the cold months. The relation between these diseases and the atmospheric temperature is well marked, but accurate statistics like these are needed to show just what that relation is. We find, also, that other meteorological conditions than atmospheric temperature have a marked effect upon many of the diseases, apparently diminishing the effect of temperature in some instances, increasing its effect in other instances, as is the case with the wind. For these reasons the State Board of Health undertakes, by a compilation of the weekly reports of sickness in connection with the various meteorological conditions, to learn what constant, and, therefore, probably causal relations exist between the humidity of the air, the ozone, the velocity of the wind, the atmospheric pressure, etc., and the increased or diminished prevalence of each disease in certain months as compared with other months in the same year, or with the same month in other years or series of years.

To facilitate the study of the causes of sickness and deaths, the State is divided into eleven geographical divisions, the counties in each of which were indicated by lines on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

Physicians should have compensation for weekly reports of sickness.—Great credit is due the busy medical practitioners in Michigan who forward these reports of sickness. The service is, as a rule, without compensation; a few health officers have slight pay from their local boards of health. Each one should have full compensation. No other class of persons has knowledge of the facts that are necessary in the compilation of health statistics; and it is greatly to the credit of physicians that they are so willing to coöperate in every effort made to advance the public health.

Plan of the weekly card reports.—The plan of the weekly reports remains the same as last year. Observers now report only the diseases under their own personal observation. Previous to the year 1885, some of the observers reported such diseases as they believed to be present in their locality, even though not under their own observation. Details of the method of securing and the plan of marking these reports may be thus stated:—

The blanks for the weekly reports are printed on postal cards, which are supplied to the observers of diseases. Blank record books in which to preserve copies of the reports, remarks, etc., are also supplied to these observers, to be retained by them. The reports are forwarded weekly to the Secretary of the State Board of Health at Lansing.

The plan of making the report is as follows: Each observer is requested to mark the disease of which there was the greatest number of cases under his observation during the week for which the report is made, 1; that of which there was the next greatest number of cases, 2; the next, 3; and so on, applying *consecutive* numbers to the diseases reported present; but marking with the *same* figure all diseases of which there is the same number of cases; to write 0 opposite each disease mentioned of which there was no case; to apply these numbers without regard to the severity of the cases; to include all cases, without regard to when they were taken sick, so long as they are actually sick with the given disease; to include all cases "under the observation" of the observer. A blank is left on the card for the convenience of those observers who prefer to state the number of cases rather than the order of prevalence by the foregoing method.

To illustrate the method of making the reports, the following copy of one of the blanks now in use is given, correctly marked, in the "prevalence" column, for the number of cases stated on the right hand margin. It should be remembered that the numbers in the "prevalence" column denote simply the relative order in which the several diseases appear to be prevalent, and do not denote a definite number of cases; so that a disease might one week be marked 4, and the following week, with the same number of cases, be marked 1. Names of diseases printed in italics are not *printed* on the postal blanks, but are supposed to have been *written* on the report by the observer.

[Ed. 50.] REPORT of diseases under the observation of representative physicians in active general practice.

Diseases in..............................and vicinity,

week ending Sat..................................*190*..

DISEASES.	CASES OBSERVED.	
	Order a.	No. of Cases.
Brain, Inflammation of........	*14*	*1*
Bowels, Inflammation of......	*12*	*3*
Bronchitis........................	*11*	*4*
Cerebro-Spinal Meningitis....	*0*	*0*
Cholera Infantum.............	*8*	*9*
Cholera Morbus................	*10*	*6*
Consumption, Pulmonary.....	*10*	*6*
Croup, Membranous...........	*12*	*3*
Diphtheria........................	*5*	*14*
Diarrhea..........................	*3*	*17*
Dysentery.........................	*8*	*9*
Erysipelas........................	*13*	*2*
Fever, Intermittent...........	*2*	*21*
Fever, Remittent..............	*11*	*4*
Fever, Typhoid (Enteric).....	*0*	*0*
Fever, Typho-malarial........	*9*	*7*
Influenza..........................	*7*	*11*
Kidney, Inflammation of......	*14*	*1*
Measles............................	*1*	*27*
Neuralgia.........................	*14*	*1*
Pleuritis...........................	*0*	*0*
Pneumonia........................	*9*	*7*
Puerperal Fever................	*0*	*0*
Rheumatism.....................	*6*	*12*
Scarlet Fever....................	*4*	*16*
Smallpox..........................	*0*	*0*
Tonsillitis.........................	*11*	*4*
Whooping cough	*0*	*0*
Mumps............................	*6*	*12*
Dyspepsia	*11*	*4*

a. If you do not state the number of cases, please mark the disease of which there is the greatest number of cases, 1, in the order column; the disease having next greatest number of cases, 2; the next 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite each disease of which there is no case under your observation. [Full statement of plan on second, third, and fourth pages of record-book cover.] A blank indicates that the item has been overlooked. Please mail this signed and dated, as soon as convenient after close of week.

NOTICE!—If this report includes a communicable disease, please write, below, the township, city or village in which the disease is.

REMARKS:

....*M. D.*

Bulletins of "Health in Michigan."—During the year 1902 the issue of the weekly and monthly bulletins of "Health in Michigan" has been continued. These bulletins are compiled from the regular weekly card reports of physicians in all parts of the State, and from the health officers' reports of communicable diseases, which reports, excepting those weekly card reports made by voluntary observers, are made to the Secretary of the State Board of Health in compliance with law.

The bulletins give to the members of the State Board of Health, local health officers, and when published to the public, information concerning the "diseases which cause most sickness" in the State, the relative amount of sickness from each disease, and comparisons with the preceding week or month, thus showing any sudden increase or decrease which may have occurred in the prevalence of any disease, together with a comparison of the various meteorological conditions; also a comparison with the average week or month for a series of years; also (in the weekly bulletin) a list of the localities in which smallpox was reported present, which lists, if widely published, would serve to put people intending to visit such places on their guard against the disease.

As a rule, about five-eighths of the card reports reach the office of the State Board of Health in time for compilation in the weekly bulletin, and the monthly bulletins are compiled from the information used in the weekly bulletins. It is found that the statements made in the monthly bulletins are corroborated by the information, after the close of the year, from the compilation of the whole number of the reports for the corresponding months of the year.

The bulletins are an immediate ephemeral use of some of the data supplied by the reports from localities, which data finally go to make up the permanently-valuable sickness statistics, and the communicable-disease statistics in Michigan; but even this ephemeral use has been the means of disseminating among the people of Michigan much information useful for the restriction and prevention of sickness and deaths.

A copy of the weekly bulletin has been sent to such editors as have expressed a desire to have it for use, entire or in part, in their papers; and copies of the monthly bulletin have been sent to the sanitary and medical journals which are received as exchanges by the library of the State Board of Health.

There are about 1,595 cities, villages and townships in Michigan, each of which is required by law to have a health officer, and nearly every one of them contributes some fact, and some of them very many facts, useful for the promotion of the public health. The State Board of Health serves to collect these facts, group them so as to make them most useful, and give them all out again to every locality for the general good.

Annual compilation of the weekly reports.—The reports from each locality are compiled by months. The average of the numbers stating the order of prevalence of the several diseases for the month is considered an indication of the actual order of prevalence of the diseases for that time. There is also found for each locality what per cent of the reports states the presence of each disease for the given month. This per cent of reports for a single locality indicates what portion of the month the disease was present in that locality. It may also be called the per cent of weeks the disease was present. These first results of the compilation are stated in Table 3, which, on account of the space required, has not been printed in the reports since that of 1882, but is preserved in the office of the State Board for reference and study.

A combination of the statements for localities in Table 3 is made by months for the State, so far as it is represented by the localities from which reports are received, showing: (1) What per cent of the observers reported each disease each month; (2) for the localities at which a given disease was reported, an average of the per cent of weeks it was reported at those localities; (3) what per cent of all the reports received for the month stated the presence of each disease; (4) an average of the numbers denoting the order of prevalence of each disease at the localities at which it was reported present during the month.

Diseases from which there was a marked increase or decrease in prevalence in Michigan in 1902.—By referring to Tables 13 and 14, on subsequent pages, it will be seen that the diseases which showed a marked increase in 1902 over the average for the ten years, 1892-1901, are scarlet

[Continued after Table 2.]

TABLE 1.—*Stating for each of 11 years, 1892-1902, the number of reports received, and on what per cent of these reports each of 28 diseases was stated to be present; also an average for the period of 10 years, 1892-1901. The diseases are arranged in the order of greatest area of prevalence in 1902. (Continued for each month of 1901 and 1902 on the two pages following.)*

Line number.	Diseases.	What per cent of the reports stated the presence of the disease.											
		Av. 1892-1901.	1902.	1901.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.
	Av. Disease*...........	19	17	18	18	17	17	18	18	20	20	20	21
1	Rheumatism............	63	59	61	63	63	63	66	60	60	62	64	64
2	Neuralgia...............	57	52	57	56	56	54	58	54	56	56	57	61
3	Bronchitis..............	51	47	50	49	50	49	50	51	52	50	53	54
4	Tonsillitis...............	44	47	46	45	42	40	43	45	43	42	49	48
5	Influenza................	43	37	44	40	42	45	47	44	44	41	43	42
6	Diarrhea.................	38	33	36	40	37	36	34	34	42	40	40	43
7	Consumption, pul......	27	20	22	25	22	20	20	23	29	36	38	38
8	Pneumonia	20	19	20	16	17	17	19	18	21	20	22	25
9	Inflam. of kidney......	18	18	20	20	19	17	17	16	20	17	17	21
10	Pleuritis..................	16	18	17	16	16	15	18	16	17	13	14	18
11	Scarlet fever...........	10	14	14	12	8	5	4	8	12	14	10	12
12	Intermittent fever....	20	13	14	16	17	19	17	35	22	23	24	27
13	Typhoid fever (ent.)..	10	12	13	15	9	8	7	10	13	11	9	9
14	Measles..................	7	10	5	13	6	7	13	7	4	6	7	4
15	Inflam. of bowels......	11	9	9	11	10	10	10	10	11	13	12	13
16	Erysipelas...............	12	9	9	10	10	12	14	12	13	13	14	16
17	Cholera morbus........	13	8	10	14	10	12	10	11	15	14	14	15
18	Smallpox.................	1	8	7	1	.4	.04	.05	4	.3	.6	.3	.02
19	Dysentery................	13	7	9	14	13	12	12	11	15	14	13	15
20	Remittent fever........	15	7	9	11	12	13	11	16	20	20	18	21
21	Whooping-cough.......	7	7	5	5	4	5	4	7	9	12	9	10
22	Cholera infantum......	10	5	7	12	8	8	8	8	12	12	10	11
23	Diphtheria...............	5	5	5	4	3	3	5	5	5	7	7	7
24	Typho-mal. fever......	3	2	1	3	1	2	.9	2	4	4	4	5
25	Puerperal fever........	2	1	2	2	2	2	2	2	2	2	3	4
26	Meningitis...............	1	1	1	1	3	2	1	1	.8	1	2	2
27	Inflam. of brain.........	2	1	.9	1	2	2	2	3	3	3	3	3
28	Membran. croup........	1	.5	.4	.4	.6	.5	.7	1	2	2	2	3
	No. of reports received....	†5,117	5,979	5,850	5,513	5,126	5,219	4,418	3,940	4,395	5,572	5,853	5,281

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* The numbers opposite the names of the diseases do not state what per cent of the whole number of reports for the year stated the disease to be present at some time during the year, but state (on an average for twelve months of the year) what per cent of reports for the several months stated the disease to be present, in those months. The column for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the reports for that month (the number of which is stated at the foot of the column) stated the given disease to be present in that month.

†Average per year.

TABLE 1.—CONTINUED.—*Stating for each of 28 diseases by months, on what per years 1901 and 1902; also the average by*

Line number.	What per cent of the reports received stated presence of the disease.											
	January.				February.				March.			
	Diseases.	Av. 1892–1901.	1902.†	1901.	Diseases.	Av. 1892–1901.	1902.†	1901.	Diseases.	Av. 1892–1901.	1902.†	1901.
	Average disease*...	20	19	19	Average disease*.	19	20	19	Average disease*.	20	19	20
1	Rheumatism.........	65	63	63	Rheumatism.	65	65	64	Rheumatism......	68	66	66
2	Bronchitis...........	62	61	58	Bronchitis.........	63	65	59	Bronchitis.........	62	60	63
3	Neuralgia...........	62	61	63	Influenza..........	75	65	83	Influenza..........	73	57	76
4	Influenza............	72	60	74	Neuralgia..........	63	59	63	Neuralgia..........	65	56	67
5	Tonsillitis............	55	54	53	Tonsillitis..........	54	55	56	Tonsillitis..........	53	52	54
6	Pneumonia..........	36	32	30	Pneumonia.........	38	35	39	Pneumonia.........	35	32	37
7	Pleuritis..............	23	25	19	Pleuritis............	23	27	27	Pleuritis............	24	27	23
8	Diarrhea..............	22	24	18	Inflam. of kidney..	20	26	23	Inflam. of kidney..	20	24	24
9	Inflam. of kidney...	20	23	19	Diarrhea...........	21	22	14	Diarrhea...........	23	23	21
10	Scarlet fever........	12	22	13	Consumption, pul.	28	20	25	Consumption, pul.	28	20	25
11	Consumption, pul...	28	22	22	Scarlet fever......	11	19	20	Smallpox..........	1	17	6
12	Smallpox.............	8	12	6	Smallpox..........	1	13	6	Scarlet fever......	11	15	18
13	Erysipelas	13	12	10	Measles............	8	12	3	Measles............	11	13	5
14	Inflam. of bowels...	9	10	9	Inflam. of bowels.	8	12	8	Inflam. of bowels.	10	12	7
15	Typhoid fever(ent.)	8	10	20	Intermittent fev..	13	11	7	Intermittent fev..	15	10	12
16	Intermittent fever,.	15	9	12	Erysipelas.........	14	10	13	Erysipelas.........	15	8	13
17	Measles..............	6	9	3	Whooping cough..	6	6	4	Typhoid fev.(ent.)	5	7	9
18	Whooping cough...	7	6	2	Typhoid fev.(ent.)	6	6	10	Remittent fever..	10	5	6
19	Remittent fever....	12	5	7	Remittent fever..	11	6	5	Whooping-cough..	6	4	5
20	Dysentery...........	5	4	4	Diphtheria.........	5	4	4	Dysentery..........	5	4	3
21	Diphtheria..........	6	4	6	Dysentery..........	4	4	3	Diphtheria.........	5	3	4
22	Puerperal fever	3	3	2	Cholera morbus...	3	3	3	Cholera morbus...	3	2	2
23	Inflam. of brain.....	2	2	2	Puerperal fever..	3	3	2	Puerperal fever..	3	1	4
24	Cholera morbus.....	3	2	2	Meningitis	2	2	1	Meningitis.........	2	1	1
25	Typho-mal. fever...	2	2	2	Membran. croup..	2	1	.4	Typho-mal. fever.	1	.9	.7
26	Meningitis...........	1	1	2	Typho-mal. fever.	1	1	2	Inflam. of brain...	2	.7	1
27	Membran. croup....	2	.5	1	Inflam. of brain...	3	.9	1	Membran. croup..	1	.7	.4
28	Cholera infantum...	1	.2	.9	Cholera infantum.	1	.9	.6	Cholera infantum.	1	.2	.4
	Reports received‡..	432	565	587	Reports received‡	393	463	474	Reports received‡	423	426	450
	April.				May.				June.			
	Diseases.	Av. 1892–1901.	1902.†	1901.	Diseases.	Av. 1892–1901.	1902.†	1901.	Diseases.	Av. 1892–1901.	1902.†	1901.
	Average disease*...	20	17	19	Average disease*.	18	16	17	Average disease*.	17	14	16
1	Rheumatism.........	67	62	63	Rheumatism......	65	58	65	Rheumatism......	61	56	59
2	Neuralgia............	63	55	67	Neuralgia..........	58	50	61	Neuralgia..........	53	49	55
3	Bronchitis...........	61	54	60	Tonsillitis..........	44	46	48	Tonsillitis..........	36	38	41
4	Tonsillitis...........	51	51	55	Bronchitis.........	51	42	52	Bronchitis.........	43	34	47
5	Influenza.............	61	49	63	Influenza...........	40	31	43	Diarrhea	35	30	35
6	Pneumonia..........	29	26	32	Diarrhea	26	23	30	Influenza...........	25	20	28
7	Pleuritis..............	21	23	23	Pneumonia.........	20	19	24	Consumption, pul.	28	19	20
8	Diarrhea	25	22	24	Consumption, pul.	28	19	22	Measles	14	16	10
9	Consumption, pul...	29	20	26	Measles.............	15	17	7	Inflam. of kidney..	19	15	21
10	Inflam. of kidney....	22	20	22	Pleuritis............	17	16	19	Pleuritis............	13	15	15
11	Measles..............	14	17	8	Inflam. of kidney..	21	16	23	Intermittent fev..	21	14	15
12	Smallpox............	1	14	7	Scarlet fever......	10	14	13	Scarlet fever......	9	10	12
13	Intermittent fever..	20	13	14	Intermittent fev..	21	14	15	Pneumonia.........	11	10	16
14	Scarlet fever.......	12	13	14	Smallpox..........	0.9	11	6	Typhoid fev.(ent.)	5	9	4
15	Erysipelas...........	15	11	15	Inflam. of bowels.	10	9	7	Remittent fever..	15	9	8
16	Remittent fever....	12	8	7	Erysipelas.........	14	9	12	Whooping-cough..	8	8	6
17	Inflam. of bowels...	12	7	5	Typhoid fev.(ent.)	4	9	5	Erysipelas.........	13	8	10
18	Typhoid fever(ent.)	4	6	10	Remittent fever..	13	8	9	Cholera morbus...	12	8	7
19	Whooping-cough....	7	4	5	Whooping-cough..	7	6	6	Inflam. of bowels.	12	8	10
20	Meningitis...........	2	3	2	Diphtheria	4	4	4	Smallpox..........	1	7	10
21	Dysentery...........	4	3	4	Dysentery.........	5	3	4	Diphtheria	5	4	4
22	Diphtheria	4	2	2	Cholera morbus...	5	3	5	Dysentery..........	8	4	5
23	Puerperal fever	4	1	5	Meningitis	2	3	2	Cholera infantum.	7	2	4
24	Cholera infantum...	2	.9	.3	Inflam. of brain...	2	2	.4	Typho-mal. fever.	1	1	.2
25	Cholera morbus.....	4	.9	2	Puerperal fever..	3	1	4	Inflam. of brain...	3	1	2
26	Inflam. of brain.....	6	.4	0	Cholera infantum.	3	1	1	Membran. croup..	.6	.7	0
27	Membran. croup....	2	0	.5	Membran. croup..	1	.4	.5	Meningitis.........	2	.4	1
28	Typho-mal. fever...	1	0	.3	Typho-mal. fever.	1	.4	1	Puerperal fever..	3	.4	1
	Reports received‡..	341	451	368	Reports received‡	438	477	550	Reports received‡	433	451	481

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* This note is on the preceding page. ‡ The numbers in this line

† Statements in this exhibit for months in 1902, are

cent of the reports received the diseases were stated to be present in each of the months for the period of 10 years, 1892-1901.

What per cent of the reports received stated presence of the disease.												
July.				August.				September.				
Diseases.	Av. 1892-1901.	1902.†	1901.	Diseases.	Av. 1892-1901.	1902.†	1901.	Diseases.	Av. 1892-1901.	1902.†	1901.	Line number.
Average disease*...	17	15	15	Average disease*.	19	16	17	Average disease*.	19	17	10	
Rheumatism........	58	55	56	Rheumatism......	56	57	55	Rheumatism......	58	59	57	1
Diarrhea.....	54	48	57	Diarrhea.....	69	57	67	Diarrhea..........	70	57	66	2
Neuralgia...........	49	44	49	Neuralgia..........	48	47	45	Neuralgia..........	50	49	50	3
Tonsillitis...........	33	37	34	Tonsillitis.........	33	35	37	Bronchitis.........	41	43	43	4
Bronchitis...........	35	31	34	Bronchitis.........	35	32	32	Tonsillitis.........	34	41	35	5
Consumption, pul...	28	19	20	Cholera morbus...	36	27	29	Influenza..........	24	25	21	6
Cholera morbus.....	26	18	21	Cholera infantum.	31	21	28	Typhoid fev.(ent.)	19	21	23	7
Influenza............	17	15	15	Consumption, pul.	28	19	20	Consumption, pul.	27	19	23	8
Intermittent fever.	23	15	16	Dysentery.........	33	18	26	Inflam. of kidney..	15	18	16	9
Inflam. of kidney....	18	13	16	Influenza..........	17	16	13	Cholera morbus...	33	17	29	10
Cholera infantum...	19	12	17	Inflam. of kidney..	16	15	14	Cholera infantum.	30	17	27	11
Measles..............	8	11	7	Typhoid fev.(ent.)	14	15	19	Dysentery.........	35	16	25	12
Typhoid fever(ent.)	8	10	7	Intermittent fev..	25	15	17	Intermittent fev..	25	15	19	13
Pleuritis.............	11	10	11	Scarlet fever.....	7	13	10	Inflam. of bowels.	14	12	16	14
Erysipelas...........	11	10	27	Inflam. of bowels.	16	11	14	Pleuritis...........	10	10	9	15
Scarlet fever.......	7	9	11	Remittent fever..	19	10	14	Scarlet fever.....	8	9	11	16
Whooping-cough....	9	9	3	Pleuritis...........	8	8	7	Pneumonia........	7	9	5	17
Pneumonia..........	7	9	4	Whooping-cough..	8	7	1	Remittent fever..	21	8	16	18
Dysentery...........	18	9	15	Erysipelas........	9	7	5	Whooping-cough..	7	8	4	19
Inflam. of bowels...	13	8	10	Pneumonia........	5	4	3	Erysipelas.........	9	6	6	20
Remittent fever....	17	6	8	Smallpox..........	7	4	6	Measles............	2	4	3	21
Smallpox............	.9	5	7	Measles............	4	3	3	Diphtheria	4	4	4	22
Diphtheria	3	3	5	Diphtheria	4	2	3	Typho-mal. fever.	5	3	1	23
Typho-mal. fever...	3	2	1	Typho-mal. fever.	4	2	.6	Smallpox..........	.5	2	5	24
Inflam. of brain.....	2	1	.4	Meningitis.........	1	1	1	Puerperal fever..	3	2	3	25
Puerperal fever....	2	.8	1	Puerperal fever..	2	1	2	Inflam. of brain...	2	1	.7	26
Meningitis...........	2	.2	2	Inflam. of brain...	2	.8	1	Meningitis.........	2	1	.9	27
Membran. croup....	.6	0	0	Membran. croup..	.4	.2	0	Membran. croup..	.6	.4	0	28
Reports received‡..	448	628	555	Reports received‡	487	480	478	Reports received‡	432	476	437	
October.				November.				December.				
Diseases.	Av. 1892-1901.	1902.†	1901.	Diseases.	Av. 1892-1901.	1902.†	1901.	Diseases.	Av. 1892-1901.	1902.†	1901.	
Average disease*...	19	16	17	Average disease*.	18	16	17	Average disease*.	18	18	18	
Rheumatism........	62	57	58	Rheumatism......	63	57	63	Rheumatism......	64	59	62	1
Neuralgia...........	55	51	53	Tonsillitis.........	50	52	50	Tonsillitis.........	54	56	56	2
Tonsillitis...........	41	46	41	Neuralgia..........	58	51	55	Bronchitis.........	59	55	58	3
Bronchitis...........	48	45	46	Bronchitis.........	55	50	54	Neuralgia..........	58	54	56	4
Diarrhea............	50	37	46	Influenza..........	43	37	44	Influenza..........	57	49	52	5
Influenza............	29	26	27	Diarrhea..........	28	27	26	Pneumonia........	23	27	21	6
Consumption, pul...	26	21	23	Pneumonia........	18	20	17	Diarrhea..........	24	25	23	7
Typhoid fever(ent.)	22	19	23	Consumption, pul.	25	20	18	Pleuritis...........	19	23	23	8
Intermittent fever..	24	16	16	Inflam. of kidney..	19	16	18	Consumption, pul.	25	19	20	9
Inflam. of kidney...	17	15	20	Pleuritis...........	16	16	16	Inflam. of kidney..	17	17	20	10
Scarlet fever.......	9	13	14	Typhoid fev.(ent.)	17	14	14	Scarlet fever.....	12	16	18	11
Pleuritis.............	12	12	13	Intermittent fev..	20	13	14	Typhoid fev.(ent.)	11	14	11	12
Pneumonia..........	11	10	12	Scarlet fever.....	12	13	13	Erysipelas.........	14	13	10	13
Diphtheria	7	9	6	Erysipelas.........	12	9	8	Intermittent fev..	15	10	10	14
Erysipelas...........	10	9	5	Inflam. of bowels.	8	8	7	Inflam. of bowels.	9	10	8	15
Dysentery...........	21	8	13	Diphtheria	8	7	9	Whooping-cough..	7	9	7	16
Inflam. of bowels...	12	8	12	Whooping-cough..	6	7	8	Measles............	4	9	5	17
Remittent fever....	20	8	12	Remittent fever..	16	6	9	Smallpox..........	2	8	10	18
Whooping-cough....	5	8	5	Measles............	3	6	5	Diphtheria	7	7	5	19
Cholera morbus.....	14	7	11	Cholera morbus...	5	4	4	Remittent fever..	14	5	6	20
Cholera infantum...	12	5	9	Typho-mal. fever.	4	4	2	Cholera morbus...	3	3	2	21
Measles..............	2	4	4	Smallpox..........	1	3	9	Dysentery.........	4	3	3	22
Typho-mal. fever...	5	2	2	Dysentery.........	7	2	6	Inflam. of brain...	2	1	1	23
Inflam. of brain.....	2	2	.2	Inflam. of brain...	2	2	.9	Meningitis.........	1	1	2	24
Smallpox............	.6	1	3	Meningitis.........	1	1	0	Typho-mal. fever.	3	1	2	25
Puerperal fever....	2	1	.5	Cholera infantum.	2	.7	.4	Membran. croup..	2	.9	.6	26
Meningitis...........	1	1	.5	Puerperal fever..	2	.7	.7	Puerperal fever..	2	.7	1	27
Membran. croup....	1	.4	.5	Membran. croup..	2	.4	.7	Cholera infantum.	1	.4	.4	28
Reports received‡.	444	570	555	Reports received‡	444	455	451	Reports received‡	406	537	464	

state how many reports were received for the month in the given years.
graphically represented in Diagrams 1 to 5, in this article.

TABLE 2.—*By months and by geographical divisions of the State,* the names of 203 observers, whose weekly reports of diseases for 1902 are compiled in Tables 1 to 17 in this article, the localities[a] for which they report, and the number of reports received from each observer.*

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1902.—Compiled in this article.												
	Year 1902.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All localities	**5,979**	**565**	**463**	**426**	**451**	**477**	**451**	**628**	**480**	**476**	**570**	**455**	**537**
Upper Peninsula Division	**417**	**55**	**39**	**41**	**47**	**31**	**26**	**38**	**30**	**27**	**33**	**26**	**24**
Bessemer, E. H. Madajesky, M. D.	46	5	4	4	5	4	4	5	4	3	5	3	....
Crystal Falls, A. M. Darling, M. D.	42	5	4	4	5	4	4	5	4	3	4	....	....
Escanaba, A. Nelson, M. D	21	5	4	4	5	3	....	....	....	....	....	....	....
Garden, W. A. Lemire, M. D.	10	3	2	....	....	2	....	3	....	....	....	....	....
Gladstone, W. McCallum, M. D	18	5	4	4	5	....	....	....	....	....	....	....	....
Ishpeming, W. S. Picotte, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Marquette, R. C. Markham, M. D.	12	4	....	4	4	....	....	....	....	....	....	....	....
Marquette, A. W. Hornbogen, M. D.	20	....	....	....	....	....	....	4	3	4	5	4	....
Menominee, P. J. Noer, M. D.	50	5	4	4	5	4	4	3	4	4	4	4	5
Ontonagon, J. S. Nitterauer, M. D	48	4	4	3	5	3	3	5	4	3	5	4	5
Osceola Tp., *W. T. S. Gregg, M. D.*	9	5	2	2	....	....	....	....	....	....	....	....	....
St. Ignace, J. F. Darby, M. D.	35	4	3	4	3	3	3	3	3	2	....	3	4
Wakefield, J. H. Eddy, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Northwestern Division	**299**	**30**	**24**	**22**	**24**	**26**	**19**	**33**	**20**	**22**	**30**	**22**	**27**
Bear Lake, C. A. Norconk, M. D	49	5	4	4	5	4	2	5	4	4	5	3	4
Cadillac, D. Ralston, M. D	14	3	2	....	....	3	3	3	....	....	....	....	....
Fife Lake, L. S. Walter, M. D.	42	4	3	3	5	3	....	5	4	4	5	4	3
Kingsley, G. L. Fenton, M. D	22	5	4	3	4	3	....	....	....	3	....	....	....
Manistee, J. A. King, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Manton, E. Morgan, M. D.	14	3	3	4	....	2	2	....	....	....	....	....	....
Suttons Bay, E. C. Van de Walker, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Thompsonville, R. McDermott, M. D.	18	....	....	....	....	....	....	5	....	....	5	3	5
Traverse City, F. P. Lawton, M. D.	33	....	....	....	....	3	4	5	4	3	5	4	5
Northern Division	**325**	**38**	**31**	**25**	**27**	**19**	**19**	**33**	**26**	**26**	**29**	**24**	**28**
Bellaire, A. T. Bodle, M. D.	29	....	....	....	....	....	2	5	4	4	5	4	5
Boyne Falls, G. L. Laraway, M. D.	7	4	3	....	....	....	....	....	....	....	....	....	....
Central Lake, R. E. L. Gibson, M. D.	17	5	4	4	4	....	....	....	....	....	....	....	....
Central Lake, F. P. Ramsey, M. D.	14	....	....	....	....	2	3	4	2	3	....	....	....
Charlevoix, A. A. Swinton, M. D.	19	5	4	3	5	2	....	....	....	....	....	....	....
Charlevoix, R. B. Armstrong, M. D.	27	....	....	....	....	....	....	5	4	4	5	4	5
Cheboygan, S. A. St. Amour, M. D.	16	4	4	4	4	....	....	....	....	....	....	....	....
Cheboygan, W. F. Reed, M. D	35	....	....	....	....	4	4	5	4	4	5	4	5
East Jordan, F. C. Warne, M. D	47	5	4	3	4	3	4	4	4	4	5	4	3
Elk Rapids, A. B. Conklin, M. D.	12	5	4	3	....	....	....	....	....	....	....	....	....
Kalkaska, P. W. Pearsall, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Petoskey, G. E. Reycraft, M. D.	22	5	4	4	5	4	....	....	....	....	....	....	....
Vanderbilt, W. H. Marshall, M. D.	27	....	....	....	....	....	2	5	4	3	4	4	5
Northeastern Division	**121**	**14**	**12**	**11**	**14**	**10**	**8**	**10**	**8**	**8**	**10**	**8**	**8**
Harrisville, *D. W. Mitchell, M. D.*	53	5	4	4	5	4	4	5	4	4	5	4	5
Rogers City, C. W. Isaminger, M. D.	17	4	4	3	4	2	....	....	....	....	....	....	....
West Branch, W. H. Witter, M. D.	51	5	4	4	5	4	4	5	4	4	5	4	3
Western Division	**641**	**47**	**43**	**40**	**50**	**50**	**50**	**67**	**54**	**53**	**64**	**54**	**69**
Casnovia, F. D. Hersey, M. D.	8	....	2	....	....	....	....	4	2	....	....	....	....
Custer, A. D. Kibbie, M. D.	47	5	4	4	4	2	4	5	4	4	3	3	5
Grand Haven, W. S. Walkley, M. D.	49	5	4	3	5	3	4	5	4	3	4	4	5
Hesperia, J. W. Hawkey, M. D	34	....	....	....	....	4	4	5	4	4	5	3	5
Holland, B. B. Godfrey, M. D.	33	....	2	3	....	3	3	3	3	4	3	4	5
Lisbon, S. E. Morgan, M. D.	8	....	....	....	....	4	4	....	....	....	....	....	....
Lowell, O. C. McDannell, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Ludington, E. F. Atwood, M. D.	23	....	....	....	....	....	....	3	3	3	5	4	5
Muskegon, J. F. Denslow, M. D.	52	5	4	4	5	4	4	5	3	4	5	4	5
Muskegon Heights, M. Mason, M. D.	23	5	3	4	5	4	2	....	....	....	....	....	....
Muskegon Heights, R. G. Olson, M. D.	32	....	....	....	....	2	3	5	4	4	5	4	5
Newaygo, N. M. Massey, M. D.	15	....	....	....	3	4	4	4	....	....	....	....	....
Rockford, H. O. Sarber, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Sand Lake, A. R. Hicks, M. D.	39	4	4	3	3	2	3	....	3	4	4	4	5

*The counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

a In many cases the reports include sickness in the vicinity as well as the corporate limits of the places named.

TABLE 2.—CONTINUED.

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1902.—Compiled in this article.												
	Year 1902.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Western Division—Continued.													
Scottville, E. P. Thomas, M. D	26	....	....	....	....	....	....	4	4	4	5	4	5
Sparta, J. Gillett, M. D	52	5	4	4	5	4	3	5	4	4	5	4	5
White Cloud, W. C. Derby. M. D	52	5	4	4	5	4	4	5	4	3	5	4	5
Whitehall, L. W. Keyes, M. D	42	3	4	3	5	2	....	4	4	4	5	4	4
Northern Central Division	**339**	**33**	**28**	**21**	**24**	**26**	**29**	**37**	**31**	**33**	**33**	**21**	**23**
Big Rapids, W. A. Whitney, M. D	33	5	4	....	....	....	2	4	4	3	4	3	4
Clare, J. A. Reeder, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Evart, J. M. Wilkinson, M. D	13	....	....	....	3	3	3	....	2	2	....	....	....
Farwell, L. L. Kelly, M. D	34	4	4	3	3	3	4	4	3	4	....	2	....
Gladwin, C. G. Suylandt, M. D	13	4	4	2	3	....	....	....	....	....	....	....	....
Gladwin, J. W. Leininger, M. D.	4	....	....	....	....	....	....	....	....	....	....	....	4
Lake City, D. J. Erwin, M. D	27	....	....	....	....	....	....	5	4	4	5	4	5
McBain, S. D. Yerington, M. D	11	....	....	....	....	....	....	....	2	4	5	....	....
Midland, W. H. Brock, M. D	9	....	....	....	....	....	....	....	....	4	5	....	....
Mt. Pleasant, L. J. Burch, M. D	25	5	4	4	....	4	4	4	....	....	....	....	....
Reed City, T. F. Bray, M. D	29	....	....	....	....	4	4	5	4	4	4	4	....
Roscommon, J. H. Curnalia, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Tustin, C. W. Logan. M. D	35	5	4	4	5	4	4	5	4	....	....	....	....
Bay and Eastern Division	**740**	**64**	**52**	**52**	**58**	**66**	**59**	**81**	**55**	**56**	**63**	**56**	**78**
Almont, D. H. Burley, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Brown City, J. W. Weed, M. D	17	3	2	....	....	2	2	....	2	2	....	....	4
Capac, E. J. Buck, M. D	8	....	....	....	....	....	4	4	....	....	....	....	....
Cass City, D. P. Deming, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Croswell, H. H. Learmont, M. D	27	....	....	....	....	....	....	5	4	4	5	4	5
Deckerville, G. C. Vincent, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Dryden, I. E. Parker, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Emmett, J. L. Chester, M. D	36	4	3	3	3	3	3	4	3	2	4	....	4
Forestville, A. Stephens, M. D	38	....	....	....	3	4	4	5	4	4	5	4	5
Lexington, L. T. Schurrer, M. D	21	5	4	4	5	3	....	....	....	....	....	....	....
Lexington, W. J. Foster, M. D	34	....	....	....	....	3	4	5	4	4	5	4	5
Marine City, T. E. DeGurse, M. D	12	4	3	2	3	....	....	....	....	....	....	....	....
Mayville, R. C. Buck, M. D	39	....	....	....	4	4	4	5	4	4	5	4	5
Oakley, T. H. O'Rourke, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Port Austin, R. J. Smith. M. D	16	....	....	....	....	2	....	4	2	....	....	4	4
Port Sanilac, F. H. Ferguson, M. D	21	4	4	4	5	4	....	....	....	....	....	....	....
Reese, J. Mackenzie, M. D	52	5	4	4	5	4	3	5	4	4	5	4	5
Sanilac Center, J. W. Scott, M. D	11	....	....	....	....	3	....	....	....	4	....	4	....
Sebewaing, H. R. Morris, M. D	13	5	4	4	....	....	....	....	....	....	....	....	....
Sebewaing, B. Friedlaender, M. D	32	....	....	....	....	4	3	5	4	4	5	4	3
St. Charles Tp., *A. Paterson, M. D.*	8	....	4	4	....	....	....	....	....	....	....	....	....
St. Charles Tp., *C. M. Bradt, M. D*	33	....	....	....	....	4	4	4	4	4	4	4	5
St. Clair, G. E. Henson, M. D	11	....	....	....	....	2	4	5	....	....	....	....	....
Vassar, F. D. Le Valley, M. D	26	5	....	3	5	4	4	5	....	....	....	....	....
West Bay City, A. F. Hagadorn, M. D	16	4	4	4	....	....	....	....	....	....	....	....	4
Yale, B. F. Codrington, M. D	4	....	....	....	....	....	....	....	....	....	....	....	4
Central Division	**1,036**	**88**	**74**	**69**	**60**	**84**	**86**	**113**	**89**	**79**	**111**	**87**	**96**
Alma, I. N. Brainerd, M. D	51	5	4	4	5	3	4	5	4	3	5	4	5
Bancroft, T. N. Yeomans, M. D	28	3	3	2	....	2	2	4	3	2	3	4	....
Belding, I. Ohlinger, M. D	25	....	....	....	....	....	....	3	4	4	5	4	5
Castleton Tp., *E. T. Morris, M. D*	26	....	....	....	....	2	4	5	4	4	5	2	....
Charlotte, A. R. Stealy, M. D	23	....	....	....	....	2	4	5	4	....	....	4	4
Clio, P. B. Taylor, M. D	26	....	....	....	....	3	4	3	2	2	4	4	4
Durand, L. D. Hixson, M. D	16	5	4	4	3	....	....	....	....	....	....	....	....
Eagle, H. N. Swaney, M. D	26	....	....	....	....	....	....	4	4	4	5	4	5
Eaton Rapids, J. M. Gallery, M. D	7	3	4	....	....	....	....	....	....	....	....	....	....
Elsie, D. F. Brown, M. D	37	3	4	3	....	3	4	5	2	2	4	4	3
Fenton, A. G. Wright, M. D	19	5	2	....	....	....	....	....	....	....	5	4	3
Fenton, E. Bachman, M. D	13	....	....	....	....	4	4	5	....	....	....	....	....
Flint, N. Bates, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Flushing, C. S. Wheeler, M. D	53	5	4	4	5	4	4	5	4	4	5	4	5
Grand Ledge, A. N. Hixson, M. D	8	....	....	....	....	....	....	3	....	....	5	....	....
Greenville, C. O. Jenison, M. D	52	4	4	4	5	4	4	5	4	4	5	4	5
Hastings, D. E. Fuller, M. D	12	5	4	3	....	....	....	....	....	....	....	....	....
Howard City, J. Totten, M. D	42	5	4	4	5	4	4	5	4	4	3	....	....
Ionia, H. Tremayne, M. D	18	5	4	4	5	....	....	....	....	....	....	....	....
Ionia, J. G. Conner, M. D	35	....	....	....	....	4	4	5	4	4	5	4	5
Laingsburg, R. H. Scott, M. D	9	3	3	3	....	....	....	....	....	....	....	....	....
Lakeview, F. R. Blanchard, M. D	4	....	....	4	....	....	....	....	....	....	....	....	....
Lansing, C. D. Black, M. D	28	....	....	....	....	4	3	4	....	3	5	4	5

TABLE 2.—Continued.

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1902.—Compiled in this article.												
	Year 1902.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Central Division—Continued.													
Linden, H. H. Chase, M. D.	50	5	4	4	4	3	4	5	4	4	5	4	4
Mason, G. E. Mann, M. D.	8	3	3	2	....	....	....	....	....	....	....	....	....
Morrice, W. Shaw, M. D.	45	5	4	4	5	4	3	3	4	3	4	2	4
Mt. Morris, H. W. Graham, M. D.	34	....	....	....	....	4	4	5	4	4	5	4	4
Ovid, J. E. Taylor, M. D	49	5	4	4	5	2	4	3	4	4	5	4	5
Ovid, O. B. Campbell, M. D.	29	....	....	....	....	....	2	5	4	4	5	4	5
Owosso, C. Shickles, M. D.	13	5	4	4	....	....	....	....	....	....	....	....	....
Owosso, J. O. Parker, M. D.	16	....	....	....	....	3	4	4	3	....	....	2	....
Perry, L. M. Cudworth, M. D.	25	4	3	4	3	3	....	....	3	....	....	2	3
Pewamo, J. R. Hay, M. D.	16	....	....	....	....	4	....	....	2	4	3	....	3
Potterville, L. E. Higbee, M. D.	36	....	....	....	3	4	4	4	4	4	5	4	4
Sheridan, R. H. Blaisdell, M. D.	8	....	....	....	....	4	4	....	....	....	....	....	....
Stockbridge, G. A. Rowe, M. D.	35	....	....	....	....	4	4	5	4	4	5	4	5
Vermontville, S. B. Stegman, M. D.	10	....	....	....	3	2	....	3	2	....	....	....	....
Vernon, W. H. Holtzman, M. D.	51	5	4	4	4	4	4	5	4	4	5	3	5
Southwestern Division	**578**	**55**	**43**	**41**	**47**	**39**	**36**	**54**	**47**	**46**	**57**	**51**	**62**
Benton Harbor, W. Ryno, M. D.	18	5	4	4	5	....	....	....	....	....	....	....	....
Berrien Springs, W. F. Bullard, M. D.	35	....	....	....	....	4	4	5	4	4	5	4	5
Douglas, H. A. Stroud, M. D.	31	....	....	....	....	....	4	5	4	4	5	4	5
Dowagiac, W. E. Parker, M. D.	11	....	....	....	....	....	....	....	....	....	3	4	4
Eau Claire, J. H. Herring, M. D.	8	5	3	....	....	....	....	....	....	....	....	....	....
Galien, F. O. Higbee, M. D.	52	5	4	4	5	4	3	5	4	4	5	4	5
Hartford, H. C. Maynard, M. D.	13	5	4	4	....	....	....	....	....	....	....	....	....
Hartford, W. R. Sober, M. D.	26	....	....	....	....	....	....	4	4	4	5	4	5
Lawton, I. E. Hamilton, M. D.	29	....	....	....	3	4	....	3	3	3	4	4	5
Niles, J. D. Greenamyer, M. D.	50	5	4	4	4	4	3	5	4	3	5	4	5
Otsego, M. Chase, M. D.	48	5	4	4	5	4	4	5	4	4	....	4	5
Paw Paw, C. S. Maynard, M. D.	43	....	....	3	5	4	4	5	4	4	5	4	5
Saugatuck, R. J. Walker, M. D.	12	5	4	3	....	....	....	....	....	....	....	....	....
South Haven, M. E. Bishop, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Three Oaks, R. C. Knox, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Vandalia, O. J. East, M, D.	49	5	4	3	5	3	3	4	4	4	5	4	5
Watervliet, F. W. Brown, M. D.	47	5	4	4	5	4	3	3	4	4	5	3	3
Southern Central Division	**1,002**	**78**	**67**	**67**	**64**	**84**	**85**	**120**	**94**	**90**	**102**	**71**	**80**
Albion, G. C. Hafford, M. D.	48	5	4	3	5	4	3	5	4	4	5	2	4
Augusta, C. E. Doyle, M. D.	51	5	4	4	3	4	4	5	4	4	5	4	5
Bronson, J. E. Outwater, M. D.	21	....	....	....	....	4	4	5	4	4	....	....	....
Burr Oak, Rose Crofford, M. D.	20	....	....	....	....	4	4	5	4	3	....	....	....
Camden, J. A. Bates, M. D	31	....	3	4	....	3	2	4	3	....	3	4	5
Clayton, J. E. McDonald, M. D.	32	....	....	....	....	4	4	4	4	3	5	4	4
Climax, O. F. Seeley, M. D.	24	....	....	3	5	3	....	3	2	3	3	2	....
Clinton, J. L. Tuttle, Jr., M. D.	30	....	....	....	....	4	3	5	4	2	5	4	3
Colon Tp., *M. L. Bacon, M. D*	16	3	4	3	4	2	....	....	....	....	....	....	....
Comstock Tp., *W. L. McBeth, M. D*	11	4	4	3	....	....	....	....	....	....	....	....	....
Concord, J. L. Parmeter, M. D.	52	5	4	3	5	4	4	5	4	4	5	4	5
Constantine, L. K. Slote, M. D.	10	4	3	3	....	....	....	....	....	....	....	....	....
Constantine, E. J. Brady, M. D.	30	....	....	....	....	4	4	4	3	4	4	3	4
Deerfield, W. Bliss, M. D.	25	....	....	....	....	....	2	4	4	4	5	2	4
Dexter, W. C. Wylie, M. D.	17	....	....	....	....	....	....	4	....	4	....	4	5
Galesburg, W. A. Burdick, M. D.	25	....	....	....	....	3	3	4	4	3	5	3	....
Grass Lake, W. D. Lyon, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Hanover, E. M. Vardon, M. D.	23	....	....	....	....	....	....	4	3	4	4	4	4
Hillsdale, F. C. Mason, M. D.	18	5	4	4	5	....	....	....	....	....	....	....	....
Hillsdale, S. B. Frankhauser, M. D.	33	....	....	....	....	3	4	5	4	4	5	3	5
Hudson, G. W. Rice, M. D.	18	5	4	4	5	....	....	....	....	....	....	....	....
Hudson, M. B. Prentiss, M. D.	25	....	....	....	....	3	3	5	4	4	3	....	3
Jackson, J. T. Main, M. D.	43	4	4	4	4	4	3	5	3	3	5	4	....
Jonesville, M. Graham, M. D.	30	....	....	....	5	3	4	4	4	4	4	2	....
Litchfield, J. J. Heator, M. D.	9	5	4	....	....	....	....	....	....	....	....	....	....
Marshall, L. S. Joy, M. D.	17	5	4	4	4	....	....	....	....	....	....	....	....
Marshall, E. J. Marshall, M. D.	32	....	....	....	....	4	4	5	4	4	4	4	3
Mendon, C. E. Barninger, M. D.	33	3	3	4	....	3	4	4	4	2	4	2	....
Milan, A. G. Mesic, M. D.	41	5	4	3	....	....	2	5	4	4	5	4	5
Sturgis, T. O. Potter, M. D.	19	....	....	4	5	3	4	3	....	....	....	....	....
Tecumseh, *J. F. Jenkins, M. D*	45	5	3	3	4	3	4	4	4	4	4	4	3
White Pigeon, E. C. Dunning, M. D.	26	....	....	....	....	4	4	4	4	3	4	....	3
Wright Tp., *C. Bates, M. D.*	49	5	4	4	5	4	4	5	4	4	5	....	5
Ypsilanti, H. B. Britton, M. D.	11	5	3	3	....	....	....	....	....	....	....	....	....
Ypsilanti, C. R. Wilcoxson, M. D.	34	....	....	....	....	3	4	5	4	4	5	4	5

TABLE 2.—CONCLUDED.

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1902.—Compiled in this article.												
	Year 1902.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Southeastern Division	**481**	**63**	**50**	**37**	**36**	**42**	**34**	**42**	**26**	**36**	**38**	**35**	**42**
Armada E. E. Evans, M. D	48	5	4	2	5	4	4	5	3	4	5	4	3
Delray, B. G. Monkman, M. D	17	5	4	....	4	2	....	....	2	....	....	....	....
Dundee, A. E. Unger, M. D.	28	4	3	3	4	3	3	....	....	....	....	4	4
Fraser, F. Grover, M. D.	23	....	....	....	....	4	3	5	2	3	....	3	3
Hamtramck, J. E. Burgess, M. D	13	5	4	4	....	....	....	....	....	....	....	....	....
Highland Park. H. W. Scott, M. D	49	5	4	3	5	4	4	4	3	4	5	4	4
Memphis, E. D. Mills, M. D.	20	4	4	2	....	4	2	4	....	....	....	....	....
Orion, G. T. Imrie, M. D.	12	....	....	....	....	....	....	....	....	4	4	4	....
Ortonville, E. B. Guile, M. D.	4	....	....	....	....	....	....	....	....	....	....	....	4
Petersburg, F. B. Jones, M D.	9	5	4	....	....	....	....	....	....	....	....	....	....
Plymouth, F. B. Adams, M. D.	49	5	4	4	5	4	4	5	....	4	5	4	5
Richmond, J. F. McCarty, M. D.	13	5	4	4	....	....	....	....	....	....	....	....	....
Richmond, F. T. Fenton, M. D.	34	....	....	....	....	4	3	5	4	4	5	4	5
Romeo, W. Greenshields, M. D.	33	5	3	3	5	3	3	....	....	3	4	....	4
South Lyon, L. A. Sayles, M. D.	13	5	4	4	....	....	....	....	....	....	....	....	....
South Lyon, M. G. Millman, M. D	12	....	....	....	....	2	....	4	4	2	....	....	....
Warren, J. C. Flynn, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Woodmere, T. Schmalzriedt, M. D	51	5	4	4	3	4	4	5	4	4	5	4	5

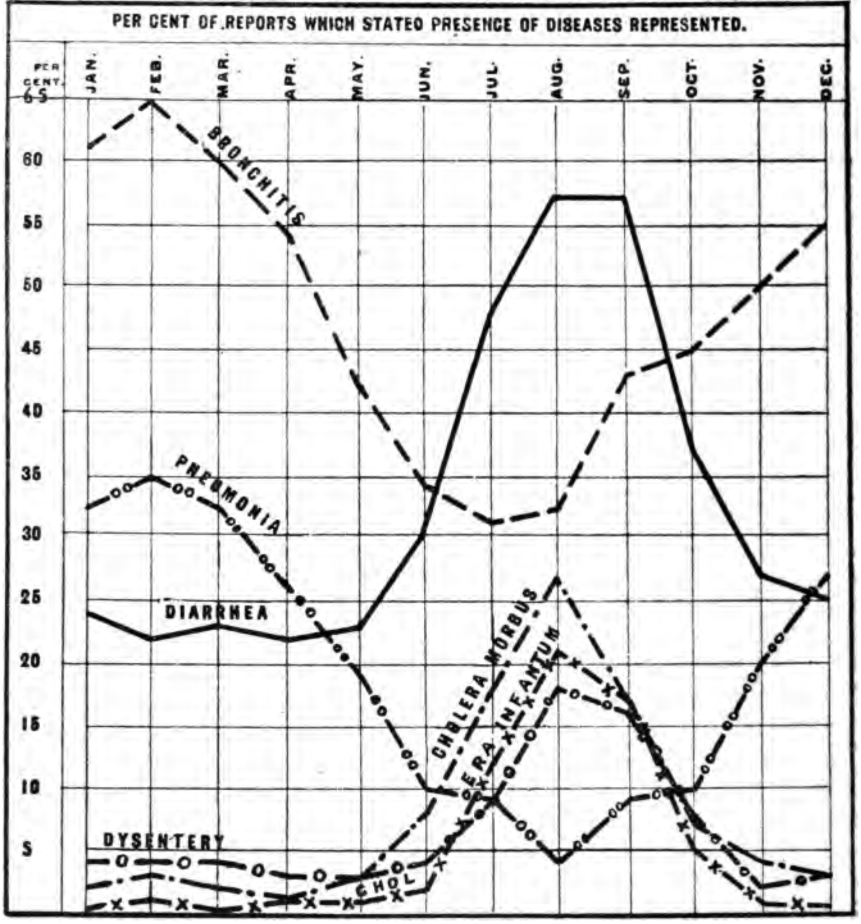
fever, smallpox, and measles; the diseases in which the decrease in 1902 appears most marked, when compared with the above-mentioned average, are intermittent fever, remittent fever, diphtheria, consumption, erysipelas, cholera infantum, cholera morbus, dysentery, puerperal fever and inflammation of brain.

The lessened prevalence, in recent years, of some of the dangerous communicable diseases, as shown in the diagrams on pages 3 and 4 of the annual report of this Board for 1901, was undoubtedly due to the persistent efforts of the State Board of Health, with the co-operation of local health officers in the State, for the education of the people in the prompt and thorough isolation of infected persons and those who may have been exposed to a dangerous communicable disease, and the subsequent disinfection, after recovery, or death, of all infected articles.

Method of comparison of diseases by years, months, and weeks.—In the annual reports ending with that for 1888, mention was made of diseases in which a difference of seven or more was shown between the per cents of reports stating the presence of the disease in the current year and in the preceding year or term of years; in the reports since that for 1888 those diseases were mentioned of which the comparison showed an increase or decrease of twenty-five per cent from the preceding year, or from the normal, as the case may be.

In this report, those diseases which are reported by seven or more observers, and which show an increase or decrease of twenty-five per cent, are generally mentioned, except in cases of cholera, smallpox, typhus fever or other particularly interesting or dangerous disease, and these are specially considered in each instance.

DIAGRAM I—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1902.



[PLATE 1180]

TABLE 4*.—*Stating for each of 11 years, 1892-1902, the number and per cent of observers by whom the following diseases were reported present; also an average for the period of 10 years, 1892-1901. The diseases are arranged in order of greatest number of observers who reported them present in 1902.*† *(Continued for each month of 1901 and 1902 on the two pages following.)*

Line number.	Diseases.	Observers by whom the several diseases were reported present—average per cents (per month) of those making reports.‡											
		Av. 1892-1901.	1902.	1901.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.
	Average for tabulated diseases reported present..........	28	25	26	28	26	26	27	21	30	30	31	33
1	Rheumatism...........	78	73	74	76	74	76	81	78	78	78	80	83
2	Neuralgia..............	74	67	71	72	69	70	74	74	74	74	76	80
3	Tonsillitis..............	66	66	66	65	63	60	64	70	66	64	71	71
4	Bronchitis..............	67	62	64	64	64	65	66	70	69	67	72	72
5	Diarrhea................	57	52	54	59	55	55	53	55	60	58	61	63
6	Influenza................	57	49	56	54	53	59	61	59	58	55	57	56
7	Pneumonia..............	35	35	35	30	31	33	36	34	36	36	37	43
8	Pleuritis.................	30	31	31	30	30	29	30	32	32	28	27	35
9	Inflam. of kidney......	31	30	31	34	30	29	30	29	33	31	29	36
10	Consumption, pul......	34	25	27	30	28	25	25	29	35	43	47	49
11	Scarlet fever...........	17	23	21	21	14	9	8	14	19	24	19	22
12	Intermittent fever....	32	23	23	27	28	32	27	31	35	36	37	43
13	Inflam. of bowels......	24	20	20	24	21	24	24	23	25	27	25	28
14	Typhoid fever (ent.)..	17	18	20	22	14	14	11	16	21	18	15	15
15	Erysipelas..............	25	17	18	20	20	25	27	26	28	27	29	34
16	Measles.................	13	16	9	23	12	12	22	12	8	11	14	7
17	Cholera morbus.........	24	16	19	25	19	23	21	23	26	27	26	29
18	Dysentery..............	25	16	19	28	23	23	24	23	28	27	25	29
19	Remittent fever.......	25	14	17	20	21	22	20	27	32	31	28	34
20	Smallpox...............	1.7	13	11	2	.7	.1	.09	1	.5	1	.3	.08
21	Whooping-cough......	11	11	7	8	6	8	7	12	14	18	15	18
22	Cholera infantum......	18	11	15	22	14	16	14	15	22	20	18	21
23	Diphtheria..............	10	10	11	8	5	6	10	10	10	13	13	15
24	Puerperal fever.......	5	4	7	4	5	5	7	6	7	6	9	11
25	Typho-mal. fever......	6	3	3	5	3	5	2	6	8	8	9	10
26	Inflam. of brain.........	6	3	3	3	5	5	6	7	8	9	8	9
27	Meningitis..............	4	3	3	3	7	6	3	4	2	4	5	5
28	Membran. croup.......	3	1	1	1	2	2	3	2	4	5	5	8
	No. of observers.......	§196	203	229	210	213	217	167	144	185	189	205	199
	Av. No. of observers per month..........	109	124	126	118	111	114	98	82	94	116	113	109

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*Table 8 is manuscript; not printed for lack of space. †For 1902 the names of the observers and the number of the reports received from each are stated in Table 2.

‡Foot note on page 73. §Average per year

TABLE 4.*—CONTINUED.—*Per cent of observers by whom the several diseases were*
months for the period

Per cent of observers by whom the diseases were reported present.‡

Line number.	January.				February.				March.			
	Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.
	Average	28	29	26	Average	29	28	29	Average	29	27	27
1	Rheumatism	81	80	77	Rheumatism	79	80	80	Rheumatism	82	76	75
2	Influenza	83	77	86	Bronchitis	76	76	72	Bronchitis	76	74	70
3	Neuralgia	77	76	77	Neuralgia	79	74	77	Neuralgia	79	71	75
4	Bronchitis	77	75	69	Tonsillitis	73	73	72	Tonsillitis	75	69	69
5	Tonsillitis	76	72	73	Influenza	86	72	89	Influenza	86	69	85
6	Pneumonia	59	57	60	Pneumonia	58	52	58	Pneumonia	59	52	55
7	Diarrhea	42	47	40	Inflam. of kidney	32	44	31	Pleuritis	40	41	35
8	Pleuritis	41	42	40	Diarrhea	39	42	27	Diarrhea	43	39	39
9	Inflam. of kidney	35	41	33	Pleuritis	39	40	40	Inflam. of kidney	35	38	37
10	Scarlet fever	22	38	24	Scarlet fever	18	27	28	Consumption, pul.	34	25	30
11	Consumption, pul.	34	25	28	Consumption, pul.	33	24	28	Scarlet fever	19	23	26
12	Erysipelas	28	24	21	Inflam. of bowels.	18	23	17	Smallpox	2	23	9
13	Inflam. of bowels	21	21	19	Erysipelas	29	19	24	Inflam. of bowels.	23	20	15
14	Smallpox	1	19	11	Smallpox	1	19	9	Intermittent fev.	26	20	18
15	Measles	11	18	8	Intermittent fev.	21	18	10	Measles	18	20	10
16	Typhoid fever (ent.)	13	16	31	Measles	13	18	5	Erysipelas	30	15	23
17	Intermittent fever.	32	16	23	Dysentery	9	11	6	Remittent fever	18	14	12
18	Remittent fever	19	11	16	Remittent fever	18	11	9	Typhoid fev. (ent.)	8	13	12
19	Whooping-cough	12	11	5	Typhoid fev. (ent.)	9	10	26	Diphtheria	10	8	9
20	Dysentery	13	10	13	Whooping-cough	10	10	8	Dysentery	12	8	9
21	Diphtheria	13	9	16	Cholera morbus	6	9	6	Whooping-cough	11	7	7
22	Puerperal fever	8	8	4	Diphtheria	11	8	9	Puerperal fever	8	5	8
23	Cholera morbus	7	7	6	Puerperal fever	7	6	4	Cholera morbus	8	5	5
24	Inflam. of brain	6	5	6	Meningitis	4	4	3	Membran. croup	4	3	2
25	Meningitis	4	3	6	Inflam. of brain	7	3	2	Inflam. of brain	6	2	2
26	Typho-mal. fever	4	2	6	Cholera infantum.	3	2	2	Meningitis	5	2	2
27	Membran. croup	6	2	3	Membran. croup	6	2	2	Cholera infantum.	3	.8	2
28	Cholera infantum	4	.8	4	Typho-mal. fever.	2	2	3	Typho-mal. fever.	3	.8	2
	Observers§	103	122	124	Observers§	106	124	127	Observers§	103	118	123

Line number.	April.				May.				June.			
	Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.
	Average	28	23	24	Average	28	23	27	Average	27	22	24
1	Rheumatism	79	77	66	Rheumatism	81	68	81	Rheumatism	77	69	70
2	Tonsillitis	70	73	64	Neuralgia	74	64	78	Neuralgia	71	67	70
3	Neuralgia	77	69	69	Tonsillitis	67	61	73	Tonsillitis	59	56	64
4	Bronchitis	75	67	62	Bronchitis	69	57	68	Diarrhea	58	53	56
5	Influenza	74	65	68	Influenza	57	46	58	Bronchitis	62	47	61
6	Diarrhea	43	43	38	Diarrhea	47	35	51	Influenza	39	28	41
7	Pneumonia	48	43	45	Pneumonia	39	35	43	Pleuritis	26	26	27
8	Pleuritis	36	40	36	Pleuritis	34	31	35	Intermittent fev.	34	25	22
9	Inflam. of kidney	33	37	29	Inflam. of kidney.	36	28	39	Consumption, pul.	35	25	29
10	Measles	23	32	12	Consumption, pul.	37	24	29	Inflam. of kidney.	32	25	32
11	Scarlet fever	18	28	19	Measles	26	23	14	Measles	23	23	14
12	Consumption, pul.	36	25	32	Scarlet fever	18	23	20	Pneumonia	23	22	33
13	Intermittent fever.	30	22	20	Intermittent fev.	35	22	25	Scarlet fever	16	20	17
14	Smallpox	2	21	10	Inflam. of bowels.	24	19	19	Typhoid fev. (ent.)	9	17	8
15	Erysipelas	28	20	22	Erysipelas	30	18	22	Inflam. of bowels.	27	17	21
16	Remittent fever	20	18	10	Remittent fever	23	17	17	Cholera morbus	25	16	15
17	Inflam. of bowels	20	16	10	Smallpox	2	14	12	Erysipelas	27	16	19
18	Whooping-cough	11	9	8	Typhoid fev. (ent.)	8	14	8	Whooping-cough	13	15	12
19	Typhoid fever (ent.)	7	8	14	Whooping-cough	12	12	8	Remittent fever	26	13	16
20	Dysentery	11	7	11	Diphtheria	8	9	9	Smallpox	2	13	16
21	Diphtheria	8	6	4	Dysentery	13	8	12	Dysentery	19	10	11
22	Meningitis	5	6	3	Meningitis	5	7	3	Diphtheria	9	7	7
23	Puerperal fever	8	5	8	Cholera morbus	14	7	12	Cholera infantum.	16	6	10
24	Cholera morbus	9	4	6	Inflam. of brain	7	4	2	Typho-mal. fever.	3	5	.7
25	Cholera infantum	4	3	.8	Puerperal fever	8	4	10	Inflam. of brain	7	3	5
26	Inflam. of brain	7	2	0	Cholera infantum.	8	3	5	Meningitis	5	2	1
27	Membran. croup	4	0	2	Typho-mal. fever.	3	1	2	Membran. croup	1	2	0
28	Typho-mal. fever	2	0	.8	Membran. croup	3	.7	2	Puerperal fever	7	2	4
	Observers§	98	100	118	Observers§	108	138	130	Observers§	115	126	135

***, †, ‡ These notes are on the preceding page. § The numbers in this line**

reported present by months in each of the years 1901-1902,† and the average by of 10 years, 1892-1901.

Per cent of observers by whom the diseases were reported present.‡

July.*				August.				September.				
Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.	Line number.
Average	28	24	26	Average	31	24	26	Average	51	25	38	
Rheumatism	75	69	72	Diarrhea	86	68	83	Diarrhea	85	73	79	1
Diarrhea	74	67	77	Rheumatism	75	67	71	Rheumatism	75	72	72	2
Tonsillitis	58	59	60	Neuralgia	69	63	60	Neuralgia	69	65	67	3
Neuralgia	69	56	70	Tonsillitis	58	55	59	Tonsillitis	55	63	52	4
Bronchitis	54	50	52	Diphtheria	8	5	8	Bronchitis	61	56	60	5
Cholera morbus	46	31	41	Bronchitis	55	47	50	Influenza	37	38	29	6
Intermittent fever	36	27	25	Cholera morbus	69	42	51	Dysentery	57	35	48	7
Consumption, pul	36	26	27	Cholera infantum	52	34	46	Cholera morbus	54	32	46	8
Influenza	28	25	23	Dysentery	57	31	44	Cholera infantum	49	30	44	9
Cholera infantum	35	25	39	Intermittent fev	40	25	28	Typhoid fev.(ent.)	30	27	37	10
Inflam. of kidney	31	24	33	Inflam. of kidney	28	24	25	Consumption, pul	33	25	28	11
Inflam. of bowels	28	23	25	Influenza	30	24	26	Intermittent fev	41	25	29	12
Dysentery	35	22	30	Consumption, pul	34	24	24	Inflam. of kidney	27	25	24	13
Pleuritis	23	22	25	Typhoid fev.(ent.)	23	23	27	Inflam. of bowels	30	22	31	14
Measles	16	21	16	Inflam. of bowels	35	21	28	Pneumonia	17	20	12	15
Pneumonia	25	19	11	Scarlet fever	13	21	14	Pleuritis	23	18	20	16
Erysipelas	24	19	16	Pleuritis	20	17	14	Scarlet fever	13	16	17	17
Scarlet fever	13	17	16	Remittent fever	32	16	25	Remittent fever	33	15	24	18
Typhoid fev.(ent.)	15	16	14	Erysipelas	21	13	10	Erysipelas	20	12	13	19
Whooping-cough	13	15	3	Whooping-cough	13	12	3	Measles	4	9	5	20
Remittent fever	28	14	20	Pneumonia	12	11	7	Whooping-cough	12	9	6	21
Smallpox	2	11	13	Smallpox	1	8	9	Diphtheria	9	7	9	22
Diphtheria	7	.8	13	Measles	7	7	4	Typho-mal. fever	12	6	3	23
Typho-mal. fever	7	4	5	Typho-mal. fever	10	4	2	Puerperal fever	6	6	7	24
Inflam. of brain	7	3	2	Inflam. of brain	7	3	4	Smallpox	.7	5	6	25
Puerperal fever	6	3	5	Puerperal fever	6	3	5	Inflam. of brain	6	3	2	26
Meningitis	4	.7	3	Meningitis	4	2	4	Meningitis	4	2	3	27
Membran. croup	1	0	0	Membran. croup	1	1	0	Membran. croup	2	2	0	28
Observers§	117	139	122	Observers§	115	131	133	Observers§	114	130	124	

October.				November.				December.				
Diseases.	Av. 1892-1901.	1902.	1901.	Diseases.	Av. 1892-1901.	1902.	1901.	D'seases.	Av. 1892-1901.	1902.	1901.	
Average	30	26	28	Average	29	23	37	Average	27	28	26	
Rheumatism	76	70	71	Rheumatism	77	67	77	Tonsillitis	73	78	74	1
Tonsillitis	65	70	64	Tonsillitis	69	65	66	Rheumatism	78	77	78	2
Neuralgia	73	67	71	Neuralgia	74	64	70	Bronchitis	73	71	71	3
Bronchitis	66	63	66	Bronchitis	71	62	72	Neuralgia	74	71	67	4
Diarrhea	72	60	69	Influenza	59	51	59	Influenza	72	66	69	5
Influenza	45	43	45	Diarrhea	50	43	48	Diarrhea	43	50	41	6
Intermittent fever	38	30	32	Pneumonia	37	37	31	Pneumonia	41	50	41	7
Typhoid fev. (ent.)	33	28	34	Pleuritis	30	30	30	Pleuritis	34	43	39	8
Pleuritis	26	27	31	Inflam. of kidney	31	25	29	Scarlet fever	21	30	29	9
Dysentery	41	26	25	Consumption, pul	31	25	20	Inflam. of kidney	31	29	29	10
Inflam. of kidney	30	26	33	Typhoid fev.(ent.)	26	23	21	Consumption, pul	31	24	23	11
Pneumonia	24	26	28	Intermittent fev	32	22	21	Erysipelas	27	24	19	12
Cholera morbus	30	25	26	Scarlet fever	19	20	22	Inflam. of bowels	20	22	16	13
Consumption, pul	31	24	28	Inflam. of bowels	19	17	18	Typhoid fev.(ent.)	17	19	15	14
Scarlet fever	16	21	24	Diphtheria	14	16	18	Diphtheria	13	18	10	15
Inflam. of bowels	25	18	26	Erysipelas	24	14	17	Intermittent fev	25	18	19	16
Erysipelas	21	17	14	Remittent fever	28	11	17	Smallpox	2	16	16	17
Remittent fever	33	16	22	Measles	6	11	6	Whooping-cough	10	16	10	18
Cholera infantum	26	15	27	Whooping-cough	11	8	10	Measles	7	13	10	19
Diphtheria	13	15	16	Cholera morbus	12	7	8	Remittent fever	23	12	12	20
Whooping-cough	8	12	8	Typho-mal. fever	8	6	4	Dysentery	10	10	9	21
Typho-mal. fever	10	5	6	Smallpox	2	6	11	Cholera morbus	7	8	5	22
Measles	4	5	6	Dysentery	17	5	14	Inflam. of brain	6	3	3	23
Inflam. of brain	5	4	.8	Inflam. of brain	6	4	2	Meningitis	3	3	4	24
Puerperal fever	6	4	3	Meningitis	2	2	0	Membran. croup	5	3	2	25
Smallpox	1	3	5	Cholera infantum	6	2	2	Puerperal fever	5	3	3	26
Meningitis	3	2	3	Puerperal fever	6	2	3	Typho-mal. fever	6	3	5	27
Membran. croup	4	2	3	Membran. croup	5	2	2	Cholera infantum	2	.8	2	28
Observers§	111	122	121	Observers§	109	122	127	Observers§	108	119	129	

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* state how many observers reported for the month in the given year.

TABLE 5.—WEEKLY REPORTS OF DISEASES IN MICHIGAN IN 1902.—*Exhibiting for the year and for each month of the year ending January 2, 1903, a summary relative to diseases in the State of Michigan; also for each month a summary relative to diseases in each of 11 geographical divisions* of the State.—Indicating the prevalence as regards time and area. Compiled from 5,979 weekly reports by 203 health officers of cities and villages and voluntary correspondents of the State Board of Health, reporting the diseases under their observation.*

Number of observers, reports, etc.†	Diseases.	Average per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Average order of prevalence where present. e	Average order of prevalence where present.										
						1901.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	Av. 1892-1901.
ending January 2, 1903. localities represented, 182. localities represented per month, 123. observers during the year, 203. observers per month, 124. reports compiled, 5,979.a reports per month, 498.	Average for tabulated diseases reported present	25	65	17	2.8	2.9	2.8	2.8	2.6	2.7	2.7	3.0	3.0	3.3	3.1	2.9
	Brain, inflammation of	3	35	1	4.6	4.0	3.3	3.7	3.6	3.4	4.1	4.0	4.8	4.3	3.9	3.9
	Bowels, inflammation of	20	47	9	3.8	3.7	3.7	3.6	3.3	3.3	3.5	3.6	3.8	4.0	4.1	3.7
	Bronchitis	62	76	47	2.5	2.6	2.6	2.5	2.5	2.6	2.4	2.6	2.6	2.5	2.6	2.6
	Meningitis	3	42	1	4.2	3.3	3.6	3.3	3.2	3.4	3.6	3.7	3.9	4.4	3.7	3.6
	Cholera infantum	11	49	5	3.1	3.0	3.0	3.1	2.8	2.9	2.9	3.0	3.3	3.4	3.6	3.1
	Cholera morbus	16	50	8	3.0	2.9	2.9	2.9	2.7	3.0	2.9	3.0	3.3	3.3	3.4	3.0
	Consumption, pulmonary	25	78	20	3.1	3.1	3.0	2.9	2.9	3.1	3.0	3.5	3.4	3.5	3.7	3.2
	Croup, membranous	1	31	.5	3.9	4.3	4.0	3.7	3.6	2.9	3.9	4.6	4.5	4.1	4.7	4.0
	Diphtheria	10	45	5	3.3	3.5	3.5	3.4	3.1	2.9	3.7	4.4	3.5	3.4	3.5	3.5
	Diarrhea	52	63	33	2.7	2.6	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.5
	Dysentery	16	41	7	3.3	3.2	3.2	3.0	3.0	3.2	3.0	3.2	3.3	3.6	3.8	3.3
	Erysipelas	17	51	9	3.6	3.8	3.7	3.7	3.3	3.4	3.5	3.7	3.8	3.9	4.1	3.7
	Fever, intermittent	23	57	13	2.9	3.0	2.9	2.9	2.6	2.7	2.7	2.9	2.9	2.9	3.0	2.9
	Fever, remittent	14	48	7	3.3	3.3	3.2	3.3	2.9	3.2	2.9	3.1	3.1	2.9	2.9	3.1
	Fever, typhoid (enteric)	18	63	12	3.2	3.1	2.8	2.9	2.9	3.3	3.3	3.4	3.6	3.2	3.6	3.2
	Fever, typho-malarial	3	48	2	3.7	3.7	3.0	2.6	3.1	2.7	2.8	3.2	3.7	3.6	3.7	3.2

For the year	Whole number of Average number of Whole number of Average number of Total number of Average number of	Influenza	49	74	37	2.1	1.9	2.1	1.7	1.7	1.8	1.8	2.0	2.2	2.0	2.1	1.9
		Kidney, inflammation of	30	58	18	3.6	3.7	3.5	3.4	3.2	3.4	3.5	3.6	3.7	3.7	3.6	3.5
		Measles	16	59	10	2.5	2.5	2.4	2.3	2.7	2.3	2.7	3.1	2.8	2.8	3.3	2.7
		Neuralgia	67	77	52	2.4	2.5	2.5	2.4	2.3	2.4	2.3	2.5	2.5	2.5	2.5	2.4
		Pleuritis	31	55	18	3.7	3.7	3.7	3.6	3.3	3.6	3.4	3.8	3.8	3.8	4.0	3.7
		Pneumonia	35	54	19	3.3	3.5	3.6	3.5	3.2	3.4	3.2	3.7	3.7	3.6	3.7	3.5
		Puerperal fever	4	33	1	2.8	3.1	3.4	3.5	3.1	3.1	3.2	3.5	3.9	3.8	4.1	3.5
		Rheumatism	73	81	59	2.1	2.3	2.3	2.3	2.2	2.3	2.3	2.7	2.6	2.6	2.7	2.4
		Scarlet fever	23	58	14	3.0	2.7	3.0	3.1	2.7	3.0	3.1	3.5	3.3	3.6	3.2	3.1
		Smallpox	13	60	8	2.9	2.8	2.7	4.7	2.0	2.0	6.3	2.8	4.1	4.8	5.0	3.7
		Tonsillitis	66	71	47	2.7	2.9	2.9	2.7	2.7	2.6	2.6	3.0	3.0	2.8	2.9	2.8
		Whooping-cough	11	60	7	2.5	2.8	2.5	2.3	2.4	2.1	2.4	2.6	2.9	3.0	3.0	2.6

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* The counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

† The names of observers, and number of reports received from each, are shown in Table 2.

a Not every one of the observers sent in a report for every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks.

b The numbers in this column (pages 70-73) state not what per cent of the whole number of observers for the year reported the disease present at some time during the year, but the average (for the twelve months) of the per cents (of observers making reports for the several months) by which the disease was reported present in those months. The column for the year is thus a statement for an average *month*. But on pages 72 and 73 the numbers in the "per cent of observers" column are statements for the month, and not averages. This column indicates the area of prevalence except that in a few instances there were two or more observers in one city or village.

c This column states for the year or given month, what per cent the number of reports which stated a disease to be present is of the number of card-reports received, for the given time, from such of the observers as reported the diseases present. It is, therefore, an average, not for all localities represented, but only for those at which the given disease was reported present. In the line "average for tabulated diseases" it states what per cent the number of times *all* diseases were reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the observers who during that time reported the diseases present (that is, if each of the observers had on every card he sent reported every disease present which he reported present at all). It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State or Division, as the case may be. It combines, and states, in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence. Had every observer sent a report every week of the month or year, the numbers in this column would be (for the State) the product of the numbers in the same line in the two preceding columns.

e The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State) of the order of prevalence column, in Table 3 (a table giving statements for each locality, omitted in printing this report, for want of room), by the number of observers who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "average" lines for this column are found by dividing the sum of the totals in the order of prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of observers who reported the different diseases present, thus counting each observer once for every disease he reported present. As a rule, small numbers in this column indicate a large prevalence of the disease, and *vice versa;* but the greater the number of diseases reported present by each observer from week to week, the greater will be the "average" in this column.

TABLE 5.—CONTINUED.—*Diseases in the State, 1902.* (*Foot-notes and full tabular heads are on the two preceding pages.*)

Months.†	Diseases.	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Months.†	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Months.†	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Months.†	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Months.†	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Months.†	Per cent of observers reporting presence of. b	Av. per cent of weeks re-; ported present where present. a, c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e
	Av. for tab. dis. rep. pres.	29	66	19	3.0		28	71	20	3.1		27	70	19	2.9		27	64	17	2.8		23	64	16	2.7		22	64	14	2.8
January.†	Brain, inflammation of	5	36	2	3.3	February.†	3	25	.9	4.0	March.†	2	38	.7	4.0	April.†	2	20	.4	2.5	May.†	4	43	2	4.2	June.†	3	33	1	4.3
	Bowels, inflammation of	21	47	10	4.3		23	52	12	4.2		20	52	12	3.7		16	43	7	4.3		19	49	9	3.5		17	45	8	3.3
	Bronchitis	75	81	61	2.2		76	86	65	2.4		74	83	60	2.4		67	80	54	2.4		57	73	42	2.5		47	74	34	2.6
	Meningitis	3	35	1	6.0		4	40	2	5.2		2	63	1	3.5		6	47	3	4.2		7	34	3	3.4		2	33	.4	4.0
	Cholera infantum	.8	20	.2	2.0		2	33	.9	4.0		.8	33	.2	3.0		3	27	.9	3.0		3	36	1	2.5		6	37	2	3.8
	Cholera morbus	7	31	2	3.3		9	37	3	3.5		5	35	2	3.5		4	29	.9	2.8		7	44	3	3.9		16	51	8	3.5
	Consumption, pulmonary	25	83	22	3.5		24	81	20	3.5		25	77	20	3.2		25	77	20	2.8		24	78	19	2.9		25	78	19	2.7
	Croup, membranous	2	33	.5	3.5		2	42	1	2.0		3	25	.7	3.0		0	0	0	0		.7	50	.4	4.0		2	43	.7	4.0
	Diphtheria	9	40	4	3.2		8	45	4	3.4		8	33	3	2.6		6	34	2	3.0		9	49	4	4.2		7	53	4	3.8
	Diarrhea	47	50	24	3.6		42	51	22	3.9		39	62	23	3.4		43	49	22	2.9		35	64	23	3.0		53	59	30	2.8
	Dysentery	10	44	4	2.9		11	35	4	4.6		8	50	4	4.6		7	44	3	3.1		8	34	3	3.8		10	42	4	3.6
	Erysipelas	24	47	12	3.9		19	49	10	3.8		15	47	8	3.3		20	53	11	3.2		18	48	9	3.6		16	53	8	3.5
	Fever, intermittent	16	58	9	3.3		18	62	11	3.4		20	52	10	3.5		22	58	13	2.6		22	61	14	2.5		25	58	14	3.2
	Fever, remittent	11	[illegible]	5	3.0		11	53	6	3.9		14	39	5	3.1		18	34	8	2.8		17	41	8	3.3		13	66	9	3.5
	Fever, typhoid (enteric)	16	59	10	4.1		10	53	6	2.8		13	51	7	3.1		8	77	6	3.5		14	60	9	3.5		17	53	9	2.8
	Fever, typho-malarial	2	60	2	5.3		2	50	1	4.0		.8	100	.9	4.0		0	0	0	0		1	25	.4	2.5		5	32	1	3.7
	Influenza	77	78	60	1.8		72	89	65	1.8		69	82	57	2.1		65	76	49	2.2		46	63	31	2.3		28	70	20	2.5
	Kidney, inflammation of	41	55	23	3.6		44	60	26	3.8		38	63	24	3.9		37	52	20	3.6		28	56	16	3.3		25	58	15	3.3
	Measles	18	51	9	2.9		18	67	12	3.0		20	65	13	2.5		32	51	17	2.3		23	68	17	2.2		23	68	16	2.1
	Neuralgia	76	81	61	2.6		74	79	59	2.7		71	79	56	2.6		69	78	55	2.4		64	75	50	2.2		67	75	49	2.1
	Pleuritis	42	59	25	3.6		40	67	27	4.2		41	67	27	3.8		40	55	23	4.0		31	50	16	3.6		26	57	15	3.7
	Pneumonia	57	56	32	3.4		52	68	35	3.5		52	62	32	3.3		43	60	26	3.1		35	55	19	3.1		22	48	10	3.6
	Puerperal fever	8	38	3	3.0		6	50	3	2.7		5	30	1	3.0		5	26	1	2.8		4	30	1	3.0		2	40	.4	2.5
	Rheumatism	80	79	63	2.3		80	82	65	2.6		76	87	66	2.3		77	80	62	2.1		68	83	58	1.8		69	82	56	1.8
	Scarlet fever	38	59	22	3.1		27	68	19	3.6		23	63	15	3.3		28	48	13	3.2		23	58	14	2.7		20	52	10	3.2
	Smallpox	19	66	12	3.1		19	66	13	3.1		23	72	17	2.4		21	62	14	2.6		14	74	11	2.5		13	54	7	2.9
	Tonsillitis	72	76	54	2.8		73	77	55	2.9		69	76	52	3.0		73	71	51	2.6		61	73	46	2.6		56	69	38	2.7
	Whooping-cough	11	50	6	3.2		10	67	6	3.7		7	61	4	3.5		9	45	4	2.8		12	54	6	2.6		15	53	8	2.3

	July.†				August.†				September.†				October.†				November.†				December.†			
Av. for tab. dis. rep. pres.	24	59	15	2.7	24	66	16	2.8	25	65	17	2.8	26	61	16	2.7	23	68	16	2.6	28	64	18	3.0
Brain, inflammation of	3	37	1	4.5	3	25	.8	5.6	3	33	1	3.8	4	42	2	5.6	4	35	2	5.6	3	37	1	7.3
Bowels, inflammation of	23	36	8	3.1	21	50	11	3.7	22	54	12	3.9	18	43	8	3.8	17	49	8	3.7	22	47	10	4.8
Bronchitis	38	61	31	2.6	47	67	32	3.1	56	75	43	2.7	63	72	45	2.6	62	79	50	2.5	71	78	55	2.2
Meningitis	.7	20	.2	3.0	2	63	1	4.0	2	63	1	3.5	2	40	1	4.5	2	55	1	5.3	3	35	1	3.3
Cholera infantum	25	46	12	3.0	34	61	21	3.3	30	55	17	2.9	15	35	5	3.2	2	25	.7	2.3	.8	40	.4	2.0
Cholera morbus	31	55	18	2.9	42	65	27	2.3	32	54	17	3.0	25	35	7	3.3	7	49	4	2.9	8	32	3	3.2
Consumption, pulmonary	26	74	19	2.8	24	81	19	2.8	25	73	19	2.7	24	83	21	3.0	25	79	20	3.3	24	78	19	3.9
Croup, membranous	0	0	0	0	1	25	.2	3.0	2	25	.4	7.5	2	20	.4	3.0	2	33	.4	2.5	3	26	.9	5.5
Diphtheria	8	35	3	3.4	5	37	2	4.3	7	63	4	2.4	15	62	9	3.0	16	48	7	2.8	18	38	7	3.6
Diarrhea	67	70	48	2.1	68	82	57	1.8	73	76	57	1.9	60	62	37	2.7	43	61	27	2.7	50	50	25	3.3
Dysentery	22	36	9	3.1	31	57	18	3.1	35	44	16	3.0	26	32	8	2.9	5	32	2	2.9	10	26	3	3.8
Erysipelas	19	47	10	3.6	13	52	7	3.5	12	55	6	4.1	17	52	9	3.5	14	59	9	3.6	24	56	13	4.0
Fever, intermittent	27	54	15	2.6	25	58	15	2.6	25	60	15	2.6	30	55	16	2.7	22	59	13	2.7	18	56	10	3.6
Fever, remittent	14	44	6	3.0	16	55	10	3.1	15	56	8	3.3	16	49	8	2.7	11	58	6	3.1	12	48	5	4.0
Fever, typhoid (enteric)	16	60	10	3.0	23	64	15	2.9	27	74	21	3.3	28	65	19	3.1	23	60	14	3.1	19	68	14	3.1
Fever, typho malarial	4	42	2	3.0	4	47	2	3.4	6	50	3	4.4	5	39	2	2.7	6	65	4	3.9	3	40	1	4.7
Influenza	25	57	15	2.5	24	64	16	2.1	38	65	25	2.3	43	63	26	2.3	51	72	37	2.3	66	76	49	2.0
Kidney, inflammation of	24	54	13	3.4	24	63	15	3.4	25	68	18	3.7	26	55	15	3.3	25	61	16	3.7	29	59	17	4.3
Measles	21	52	11	2.1	7	47	3	3.4	9	46	4	3.9	5	69	4	2.9	11	57	6	1.9	13	61	9	2.6
Neuralgia	56	75	44	2.3	63	74	47	2.6	65	74	49	2.4	67	76	51	2.3	64	78	51	2.3	71	79	54	2.5
Pleuritis	22	44	10	3.5	17	46	8	3.9	18	56	10	3.9	27	45	12	3.2	30	56	15	3.4	43	54	23	3.7
Pneumonia	19	43	9	3.7	11	37	4	3.4	20	43	9	3.3	26	38	10	3.2	37	54	20	3.0	50	53	27	3.5
Puerperal fever	3	25	.8	2.8	3	36	1	1.5	6	26	2	2.9	4	33	1	3.0	2	27	.7	1.7	3	25	.7	4.0
Rheumatism	69	78	55	1.8	67	85	57	2.2	72	81	59	2.0	70	83	57	1.8	67	84	57	1.9	77	78	59	2.2
Scarlet fever	17	51	9	2.6	21	64	13	3.4	16	59	9	2.7	21	61	13	2.4	20	65	13	2.8	30	53	16	2.6
Smallpox	11	48	5	3.7	8	47	4	3.8	5	50	2	2.3	3	35	1	3.0	6	58	3	2.6	16	49	8	3.2
Tonsillitis	59	62	37	2.7	55	62	35	2.9	63	66	41	2.9	70	66	46	2.5	65	79	52	2.6	78	72	56	2.6
Whooping-cough	15	63	9	2.3	12	59	7	2.7	9	86	8	1.7	12	58	8	2.0	8	82	7	2.4	16	57	9	2.3

[Foot-note from page 67.]

‡ The numbers opposite the names of the diseases do not state what per cent of the whole number of observers for the year reported the disease present at some time during the year, but state (on an average for the twelve months of the year) by what per cent of the observers making reports for the several months, the disease was reported present in those months. The columns for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the observers for that month (the number of whom is stated at the foot of the column) reported the given disease in that month.

TABLE 5.—CONTINUED.—*Diseases in the Upper Peninsula, the Northwestern, the Northern, and the Northeastern Divisions of the State for the year and by months in 1902; also an average for the period of 10 years, 1892–1901,—indicating what per cent of the weekly reports received stated the presence of the diseases named.*[d]

Division.*	Diseases.	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October	November.	December.	Division.*	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres...	20	13	15	14	14	13	12	11	12	13	12	15	11	14		19	25	25	23	23	24	21	25	24	26	24	24	27	29
Upper Peninsula Division.*	Brain, inflammation of......	3	1	7	0	0	0	0	0	0	0	0	0	0	0	Northwestern Division.*	2	1	3	0	0	0	0	0	0	0	0	3	5	0
	Bowels, inflammation of....	12	4	7	0	5	5	0	0	5	3	4	9	8	4		11	18	23	4	14	17	12	5	24	10	27	23	27	22
	Bronchitis..................	57	34	44	51	41	32	29	12	24	7	22	55	42	29		55	69	67	71	68	83	62	63	55	75	68	60	73	93
	Meningitis..................	4	7	2	10	10	11	10	0	3	13	15	9	0	4		2	3	7	0	0	4	8	0	0	0	0	3	9	0
	Cholera infantum............	16	8	2	0	0	4	3	0	16	40	22	6	0	8		13	7	0	0	0	0	0	0	39	20	14	7	0	0
	Cholera morbus..............	13	3	0	0	0	0	0	4	3	23	7	0	0	4		15	13	0	0	0	0	0	11	42	50	32	17	5	4
	Consumption, pulmonary....	39	36	27	21	32	32	35	50	50	40	41	45	42	33		28	42	43	42	36	42	54	74	39	40	36	33	32	41
	Croup, membranous.........	2	.7	0	0	2	0	0	4	0	0	0	3	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria..................	10	15	7	8	10	15	16	31	21	10	15	30	15	17		6	4	7	0	0	0	4	5	0	0	9	7	5	11
	Diarrhea....................	47	24	22	8	12	13	16	19	34	50	44	27	23	29		42	49	37	25	41	50	35	68	67	85	64	43	41	48
	Dysentery...................	16	4	9	3	2	0	3	0	5	13	0	6	4	0		13	6	0	0	18	8	0	5	12	5	5	7	9	7
	Erysipelas..................	11	2	2	5	5	6	0	0	0	0	0	0	0	4		14	19	23	21	0	17	27	26	15	5	9	7	45	37
	Fever, intermittent.........	2	0	0	0	0	0	0	0	0	0	0	0	0	0		22	21	17	17	18	21	15	37	24	25	18	27	23	19
	Fever, remittent............	1	.2	0	0	0	0	0	0	0	0	0	0	4	0		17	2	0	0	0	0	0	0	0	5	0	17	0	0
	Fever, typhoid (enteric)....	25	19	20	5	5	15	16	12	18	23	30	45	31	21		11	11	7	0	0	0	4	5	15	25	18	20	14	19
	Fever, typho-malarial.......	1	0	0	0	0	0	0	0	0	0	0	0	0	0		3	1	0	0	0	0	0	0	0	0	0	3	14	0
	Influenza...................	42	15	31	31	22	15	6	0	8	3	4	12	8	21		42	51	67	71	77	42	50	37	36	35	32	37	50	74
	Kidney, inflammation of....	20	6	15	10	10	2	0	4	8	0	11	6	0	4		17	39	27	42	36	33	27	42	39	60	50	40	41	41
	Measles.....................	8	11	9	10	17	19	13	8	13	0	7	6	4	21		9	2	0	0	0	4	0	16	3	0	0	0	0	0
	Neuralgia...................	48	20	24	28	27	17	16	19	11	20	15	30	12	21		56	69	63	75	77	79	58	58	61	75	77	60	73	78
	Pleuritis...................	15	9	16	10	12	21	19	8	0	0	0	3	4	4		17	37	43	38	55	42	27	58	36	10	9	17	41	70
	Pneumonia...................	27	24	29	23	34	32	52	19	11	10	4	12	27	25		24	37	40	42	41	38	19	21	12	0	9	27	23	52
	Puerperal fever.............	4	1	0	0	0	2	0	0	0	0	4	6	0	0		4	.3	0	0	0	0	0	0	3	0	0	0	0	0
	Rheumatism..................	50	48	55	59	44	43	45	50	50	63	44	39	42	42		55	79	83	83	86	83	81	74	70	85	73	73	68	85
	Scarlet fever...............	21	26	42	31	34	19	16	23	16	23	15	21	23	46		10	29	47	29	18	25	31	47	21	40	32	33	23	4
	Smallpox....................	2	17	16	26	39	32	26	19	3	0	0	0	4	17		8	6	13	80	5	21	12	5	0	5	0	0	0	0
	Tonsillitis.................	54	31	38	36	29	21	19	23	37	20	26	48	27	50		42	68	70	71	55	63	65	32	67	40	59	90	95	93
	Whooping-cough..............	16	5	9	5	5	0	3	8	8	3	7	3	0	0		4	12	7	4	0	0	4	11	3	20	18	30	32	22

	Av. for tab. dis. rep. pres.	20	18	22	21	22	16	17	13	16	19	19	15	26	21		22	30	27	28	31	27	23	34	29	31	33	36	34	34
Northern Division.*	Brain, inflammation of	4	.3	0	0	0	0	0	0	0	0	4	0	0	0	Northeastern Division.*	2	4	0	0	0	0	0	0	0	13	0	30	13	0
	Bowels, inflammation of	12	8	5	19	20	11	16	16	3	0	0	0	8	7		25	52	29	33	55	14	50	63	70	75	88	60	50	75
	Bronchitis	65	55	76	55	56	52	63	42	39	50	54	52	50	61		65	92	100	100	100	93	80	88	60	75	100	100	100	100
	Meningitis	2	1	0	3	4	0	5	5	0	0	0	0	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera infantum	9	7	0	0	0	0	0	11	21	35	12	3	4	0		5	5	0	0	0	0	0	0	20	38	13	0	0	0
	Cholera morbus	11	5	0	3	0	0	0	5	15	15	8	7	4	0		6	9	0	0	0	0	0	13	50	38	25	0	0	0
	Consumption, pulmonary	19	22	16	26	28	33	16	11	18	23	15	17	25	36		13	0	0	0	0	0	0	0	0	0	0	0	0	0
	Croup, membranous	2	.6	0	0	0	0	0	0	0	4	4	0	0	0		.3	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	6	4	3	0	4	0	0	0	0	0	8	21	4	4		10	3	0	8	9	7	10	0	0	0	0	0	0	0
	Diarrhea	33	38	39	26	20	19	32	37	64	54	81	41	17	25		44	50	43	33	27	0	0	100	80	100	100	90	63	13
	Dysentery	16	8	16	6	12	15	0	0	6	4	12	21	0	0		6	6	0	0	0	0	0	0	0	38	13	30	0	0
	Erysipelas	20	12	5	6	16	19	16	11	15	12	4	14	8	25		31	42	36	33	36	36	10	50	60	38	50	50	63	63
	Fever, intermittent	14	13	0	3	4	11	11	42	24	23	31	14	0	4		10	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fever, remittent	13	9	8	0	4	7	11	11	12	27	12	7	0	11		9	29	0	33	27	29	10	50	50	50	50	50	13	0
	Fever, typhoid (enteric)	9	13	24	16	12	0	0	5	0	19	19	3	17	36		1	7	0	0	0	0	0	0	0	0	38	50	0	0
	Fever, typho-malarial	2	2	0	0	0	0	0	5	0	4	12	0	0	0		2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Influenza	43	33	66	65	52	15	16	11	9	12	23	17	33	50		57	75	71	67	73	71	81	100	50	50	63	90	100	100
	Kidney, inflammation of	23	18	29	26	40	15	32	5	12	19	15	7	0	14		49	72	71	83	91	86	50	100	60	63	50	50	63	88
	Measles	9	3	3	0	0	7	5	0	12	12	0	0	0	0		6	0	0	0	0	0	0	0	0	0	0	0	0	0
	Neuralgia	59	65	71	68	72	52	63	53	64	73	58	59	67	75		60	93	100	92	100	93	80	100	90	75	88	90	100	100
	Pleuritis	25	31	53	48	56	37	21	21	18	19	12	17	25	36		35	77	86	67	82	64	80	100	50	50	63	90	100	100
	Pneumonia	21	28	47	52	40	22	32	11	12	4	4	17	38	43		21	33	29	33	36	71	40	0	0	0	0	50	50	63
	Puerperal fever	4	3	8	10	4	0	0	0	0	8	0	0	0	4		2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rheumatism	68	56	63	68	72	56	68	42	39	35	50	52	63	68		68	97	100	100	100	93	80	100	100	100	100	90	100	100
	Scarlet fever	8	10	8	16	0	11	26	0	9	12	19	7	8	7		8	2	0	8	9	0	0	0	0	0	13	0	0	0
	Smallpox	1	7	8	10	4	15	0	0	12	8	8	7	0	11		.1	5	0	0	0	0	0	0	0	0	0	0	50	25
	Tonsillitis	45	50	53	61	76	44	58	26	24	50	62	31	50	68		54	88	100	100	100	86	70	100	70	75	63	100	88	100
	Whooping-cough	6	8	8	13	24	0	0	0	30	15	0	0	0	0		4	2	0	0	0	0	0	0	0	0	0	0	0	25

*, †, d. These notes are on the first page of Table 5.

TABLE 5.—CONTINUED.—*Diseases in the Western, Northern Central, Bay and Eastern, and the Central Divisions of the State, for the year and by months in 1902; also an average for the period of 10 years, 1892-1901—indicating what per cent of the weekly reports received stated the presence of the diseases named.*[d]

Division.*	Diseases.	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Division.*	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres...	19	15	18	20	19	17	15	13	12	13	14	13	13	13		16	12	14	14	10	10	9	8	10	10	17	15	15	17
Western Division.*	Brain, inflammation of	3	.6	2	2	0	0	0	0	0	2	2	0	0	0	Northern Central Division.*	3	1	0	4	0	0	4	0	0	0	3	0	0	0
	Bowels, inflammation of	11	6	6	7	0	0	4	6	10	6	9	8	4	7		6	4	9	7	0	0	0	0	3	3	9	6	0	0
	Bronchitis	45	39	45	60	63	56	40	26	25	22	34	27	43	46		40	35	45	43	33	38	19	14	19	26	36	33	52	70
	Meningitis	2	.9	4	2	0	2	2	2	0	0	0	0	0	0		1	1	0	0	0	8	0	0	0	0	0	0	5	4
	Cholera infantum	8	5	0	2	0	2	0	0	15	20	13	2	0	0		10	5	0	0	0	0	0	0	3	16	24	3	5	0
	Cholera morbus	9	3	0	0	0	2	0	0	7	15	6	3	0	0		10	4	0	4	0	0	0	0	8	10	9	3	0	4
	Consumption, pulmonary	23	8	17	12	8	6	4	10	6	9	15	14	2	0		22	18	12	25	10	0	23	14	3	13	21	24	38	43
	Croup, membranous	1	.2	0	0	0	0	0	0	0	0	0	0	2	0		.5	.6	3	0	5	0	0	0	0	0	0	0	0	0
	Diphtheria	5	5	2	0	0	2	6	0	6	2	9	14	11	1		3	6	15	18	0	0	0	0	3	0	0	18	10	0
	Diarrhea	37	24	11	19	13	12	16	24	36	39	36	28	22	19		36	24	15	7	24	17	12	14	22	39	52	24	24	35
	Dysentery	13	3	0	0	0	0	0	4	3	6	9	5	2	1		14	2	3	4	0	0	0	0	0	3	12	0	0	0
	Erysipelas	16	18	19	28	28	20	18	18	9	17	9	16	15	22		10	6	3	7	0	0	4	0	8	6	15	15	5	0
	Fever, intermittent	24	14	15	14	18	16	14	12	15	17	11	16	17	9		34	14	12	21	10	13	23	0	14	19	12	12	24	13
	Fever, remmittent	26	12	15	14	18	26	20	6	7	13	8	9	11	9		18	2	0	0	10	4	4	7	0	0	6	0	0	0
	Fever, typhoid (enteric)	7	6	2	7	5	10	8	8	4	13	11	0	0	1		11	12	0	0	0	0	15	17	22	6	39	27	0	0
	Fever, typho-malarial	4	3	4	5	10	0	0	0	4	2	4	0	6	1		3	.3	0	0	0	0	4	0	0	0	0	0	0	0
	Influenza	48	43	68	81	70	62	46	36	15	24	32	38	37	35		29	23	33	46	29	33	8	0	3	0	12	33	38	57
	Kidney, inflammation of	22	7	2	7	5	14	8	8	4	7	11	8	6	6		10	10	12	18	5	4	8	7	8	3	6	9	29	22
	Measles	8	7	4	2	8	8	4	10	9	0	6	0	11	22		6	8	3	4	14	17	12	14	11	13	6	0	5	0
	Neuralgia	58	53	72	70	60	58	58	50	43	15	43	53	46	48		44	36	45	36	29	25	19	31	35	26	33	45	48	61
	Pleuritis	15	9	13	30	15	4	12	8	4	4	2	3	9	7		11	9	6	11	5	4	12	0	11	16	9	12	10	13
	Pneumonia	21	12	23	40	25	10	16	8	7	2	0	6	2	12		14	12	12	32	19	25	8	0	8	0	15	9	14	9
	Puerperal fever	3	2	6	5	3	6	0	0	0	0	2	2	0	0		5	1	0	0	5	4	0	3	0	0	0	0	0	0
	Rheumatism	62	59	66	65	75	62	60	54	55	54	64	52	50	55		49	50	36	32	24	33	38	41	43	55	64	73	81	83
	Scarlet fever	8	9	15	17	20	10	6	4	1	6	6	14	7	13		6	12	12	11	5	8	4	17	19	6	30	15	0	0
	Smallpox	10	11	17	23	35	22	16	12	4	2	8	5	2	4		1	14	55	39	24	0	15	0	14	3	3	3	0	13
	Tonsillitis	42	46	62	63	58	60	50	38	40	33	28	44	52	42		34	29	39	35	29	38	23	21	19	19	33	36	33	43
	Whooping-cough	6	3	4	0	0	2	4	6	10	0	6	3	0	3		6	9	12	7	0	13	8	14	14	10	21	3	0	0

	Av. for tab. dis. rep. pres...	17	13	15	18	14	11	12	11	15	12	14	11	10	14		19	18	21	21	21	20	15	15	15	17	19	16	18	18
Bay and Eastern Division.*	Brain, inflammation of......	1	.5	0	4	0	0	0	0	0	0	0	0	2	1	Central Division.*	3	1	0	0	0	0	2	1	2	1	3	3	5	0
	Bowels, inflammation of....	10	9	9	19	10	0	14	7	2	11	14	6	0	15		12	9	7	12	13	13	7	7	5	13	13	5	9	7
	Bronchitis..................	46	33	47	56	44	36	27	27	17	22	39	30	21	36		53	48	60	70	62	43	39	37	33	35	47	44	57	61
	Meningitis..................	1	.7	0	4	0	0	3	0	0	0	2	0	0	0		1	.7	2	0	0	0	0	0	0	1	0	0	0	4
	Cholera infantum............	11	5	0	0	0	0	5	0	16	16	16	6	2	0		8	4	0	0	0	0	0	2	5	19	11	4	0	0
	Cholera morbus..............	12	7	0	0	4	0	9	8	14	25	16	5	2	3		12	9	5	3	0	3	5	8	13	27	20	4	10	6
	Consumption, pulmonary ...	24	10	11	0	6	5	12	17	16	7	9	8	5	14		34	22	23	18	26	23	17	15	22	25	23	25	29	23
	Croup, membranous.........	1	.4	0	0	0	0	0	3	0	0	0	0	0	1		1	.4	0	0	0	0	0	0	0	0	1	1	1	1
	Diphtheria..................	9	3	5	4	4	0	2	0	0	2	0	5	5	10		3	6	0	4	1	0	7	7	3	3	4	10	14	15
	Diarrhea....................	34	24	9	13	12	16	17	24	40	51	50	24	18	19		40	34	30	20	28	15	17	23	51	61	62	41	26	19
	Dysentery...................	12	7	9	13	4	3	2	3	2	13	25	8	5	1		13	10	7	5	3	3	1	7	19	34	19	10	0	4
	Erysipelas..................	10	11	20	10	12	9	11	14	11	4	5	10	7	17		11	7	11	9	4	15	8	5	4	8	5	6	3	7
	Fever, intermittent.........	12	7	6	8	2	9	9	8	6	4	7	8	4	8		19	13	10	14	16	17	13	13	16	15	11	15	11	8
	Fever, remittent............	10	4	5	8	2	2	3	7	2	0	11	2	0	4		17	12	13	7	6	3	13	21	14	16	13	14	14	8
	Fever, typhoid (enteric).....	12	9	16	10	4	0	12	0	0	11	23	16	13	8		14	18	9	7	22	25	14	20	14	19	16	22	23	25
	Fever, typho-malarial.......	4	1	0	0	0	0	2	0	0	0	2	5	4	5		3	2	3	1	0	0	0	3	.9	3	0	2	6	0
	Influenza...................	40	21	39	44	38	28	17	8	9	4	7	13	21	29		42	45	76	78	71	63	32	26	18	24	41	31	53	56
	Kidney, inflammation of....	13	19	30	29	25	9	18	17	19	22	20	13	7	21		19	17	22	23	22	35	14	14	10	17	20	17	13	8
	Measles.....................	6	7	14	15	13	16	9	8	6	0	0	0	0	0		6	18	22	24	26	27	23	19	13	4	14	14	18	21
	Neuralgia...................	48	38	42	38	44	43	35	32	35	42	32	35	36	41		61	52	74	66	59	60	50	51	43	42	57	41	47	51
	Pleuritis...................	17	18	17	25	27	19	15	12	15	5	14	16	11	32		15.	11	14	22	29	20	11	10	5	2	8	4	10	13
	Pneumonia...................	18	21	31	46	37	24	14	12	10	2	21	11	27	27		18	17	26	27	28	23	15	6	9	2	10	8	28	26
	Puerperal fever.............	2	1	0	6	0	0	3	0	0	0	4	0	0	1		2	1	8	1	1	0	1	0	0	2	1	1	0	0
	Rheumatism..................	54	39	47	54	42	40	32	37	35	38	41	30	34	41		65	59	72	72	74	70	60	51	57	48	61	53	53	53
	Scarlet fever...............	10	13	22	27	17	5	18	7	9	11	0	11	13	14		9	13	22	12	7	8	10	6	8	12	11	16	18	26
	Smallpox....................	1	7	8	12	19	10	9	8	6	2	0	0	0	10		1	15	17	22	36	27	21	16	12	12	5	1	8	14
	Tonsillitis.................	41	35	42	40	37	29	35	31	32	33	38	38	36	33		42	45	59	58	52	58	40	37	26	34	37	42	49	54
	Whooping-cough............	8	5	2	8	2	5	6	7	7	5	4	2	0	8		6	8	6	11	9	2	4	13	12	9	6	6	10	4

***, †, d. These notes are on the first page of Table 5.**

TABLE 5.—CONTINUED.—*Diseases in the Southwestern and Southern Central Divisions of the State, for the year and by months in 1902, also an average for the period of 10 years, 1892–1901—indicating what per cent of the weekly reports received stated the presence of the diseases named.*[d]

Division.*	Diseases.	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres...	21	21	21	21	20	22	20	20	20	22	22	20	20	20
Southwestern Division.*	Brain, inflammation of......	3	3	21	0	7	2	10	6	4	0	0	4	0	6
	Bowels, inflammation of	12	14	13	12	12	9	10	14	13	30	22	11	10	13
	Bronchitis..................	51	61	69	65	76	79	64	61	41	45	61	54	59	60
	Meningitis..................	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera infantum............	15	7	0	2	0	2	0	6	9	30	26	9	0	0
	Cholera morbus..............	17	12	4	5	5	0	3	17	31	38	26	11	2	0
	Consumption, pulmonary....	25	24	36	35	27	32	28	22	28	26	22	18	14	8
	Croup, membranous..........	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria..................	3	1	0	2	0	0	10	0	2	0	0	2	4	2
	Diarrhea....................	38	48	29	35	32	40	46	64	67	72	65	56	39	39
	Dysentery...................	13	7	0	2	0	6	5	3	7	26	17	16	0	5
	Erysipelas..................	17	3	7	5	2	0	0	0	9	0	2	4	0	3
	Fever, intermittent.........	37	33	24	28	27	30	38	36	33	36	41	40	37	31
	Fever, remittent............	24	9	0	0	0	11	15	3	7	13	15	14	14	11
	Fever, typhoid (enteric)....	6	14	5	9	2	0	0	3	19	21	28	28	22	16
	Fever, typho-malarial.......	3	2	0	0	0	0	0	0	2	0	7	9	8	2
	Influenza...................	54	47	71	70	73	85	41	33	20	19	37	28	37	55
	Kidney, inflammation of....	21	23	16	37	27	21	18	19	22	19	28	19	27	24
	Measles.....................	8	5	0	0	5	26	10	14	4	0	0	0	0	3
	Neuralgia...................	63	64	64	63	54	66	77	78	52	60	65	65	69	61
	Pleuritis...................	15	24	42	33	24	32	15	17	15	13	17	23	24	27
	Pneumonia...................	20	21	38	37	44	43	18	17	13	2	4	4	10	29
	Puerperal fever.............	3	4	5	9	2	0	8	3	7	2	2	4	2	2
	Rheumatism..................	75	70	65	70	81	70	67	83	74	70	67	68	65	66
	Scarlet fever...............	10	13	24	14	10	9	21	11	7	15	0	9	16	16
	Smallpox....................	1	.7	4	0	0	0	0	0	0	0	0	0	0	3
	Tonsillitis.................	45	62	60	58	61	55	59	61	65	62	61	61	69	65
	Whooping-cough..............	7	8	0	0	2	4	13	3	0	9	9	16	22	13

Division.*	Diseases.	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres...	19	17	21	22	20	20	17	14	16	16	17	15	15	18
Southern Central Division.*	Brain, inflammation of......	2	.9	0	0	0	0	2	2	3	1	0	1	0	0
	Bowels, inflammation of	11	7	13	13	9	8	8	6	8	4	6	6	3	6
	Bronchitis..................	50	49	73	75	75	61	43	29	35	28	40	44	55	64
	Meningitis..................	1	.6	0	0	0	3	0	0	0	0	0	0	4	1
	Cholera infantum............	8	6	0	3	1	0	1	4	11	16	24	8	0	0
	Cholera morbus..............	16	13	6	10	4	2	4	6	27	37	24	13	1	1
	Consumption, pulmonary....	26	20	21	22	19	23	18	16	18	15	17	21	25	25
	Croup, membranous..........	1	.4	0	0	0	0	2	0	0	0	0	0	0	3
	Diphtheria..................	4	1	4	0	1	2	0	2	.8	2	1	0	0	0
	Diarrhea....................	39	36	26	28	25	25	33	27	53	57	56	36	24	19
	Dysentery...................	14	8	0	1	6	0	10	6	13	20	23	5	0	1
	Erysipelas..................	9	7	9	4	0	13	8	5	13	6	6	6	8	8
	Fever, intermittent.........	24	13	10	9	7	11	15	14	17	15	13	16	13	5
	Fever, remittent............	16	4	5	9	1	9	1	2	3	10	2	1	3	0
	Fever, typhoid (enteric)....	9	10	13	1	3	0	1	8	10	16	19	18	15	14
	Fever, typho-malarial.......	2	2	5	0	0	0	0	1	5	2	4	1	0	0
	Influenza...................	44	42	77	82	69	75	40	19	18	17	24	25	34	64
	Kidney, inflammation of....	18	14	29	28	30	17	12	8	8	5	7	7	10	15
	Measles.....................	9	10	5	18	12	17	23	19	13	2	3	2	1	5
	Neuralgia...................	65	4	73	73	69	70	67	60	61	53	59	64	61	65
	Pleuritis...................	15	17	33	33	33	22	17	9	3	9	11	13	14	24
	Pneumonia...................	20	17	41	36	37	19	19	8	7	5	9	8	13	31
	Puerperal fever.............	2	.4	0	0	0	2	0	0	0	0	1	1	1	0
	Rheumatism..................	69	68	62	66	72	70	70	68	72	69	66	66	62	70
	Scarlet fever...............	9	11	12	19	24	19	8	11	10	12	6	7	6	6
	Smallpox....................	1	2	6	0	0	8	7	1	.8	1	0	0	0	0
	Tonsillitis.................	51	52	65	75	63	69	54	47	43	30	42	41	59	63
	Whooping-cough..............	6	9	9	7	1	13	.8	9	8	6	12	13	6	16

***, †, d. These notes are on the first page of Table 5.**

TABLE 5.—CONCLUDED.—*Diseases in the Southeastern Division of the State, for the year and by months in 1902; also an average for the period of ten years, 1892–1901—indicating what per cent of the weekly reports received stated the presence of the diseases named.*[d]

Division.*	Diseases.	Av. 1892–1901.	1902.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres.	16	15	17	18	16	17	15	13	8	13	13	14	15	16
Southeastern Division.*	Brain, inflammation of	1	1	3	0	0	3	2	0	0	0	0	0	0	5
	Bowels, inflammation of	8	9	6	10	19	14	12	6	7	8	11	3	14	2
	Bronchitis	47	49	70	72	51	61	45	32	26	35	28	58	49	36
	Meningitis	1	1	0	0	0	8	7	0	0	0	0	0	0	0
	Cholera infantum	7	1	0	0	0	0	0	3	2	8	3	11	0	0
	Cholera morbus	10	7	0	6	3	0	0	18	12	19	14	11	9	5
	Consumption, pulmonary	28	16	21	22	22	14	17	9	12	23	14	16	9	14
	Croup, membranous	1	2	3	10	3	0	0	0	0	0	0	0	0	2
	Diphtheria	5	6	2	8	5	0	0	6	5	0	8	16	9	10
	Diarrhea	32	33	19	26	32	33	17	24	40	62	64	39	29	31
	Dysentery	9	4	0	2	0	3	2	3	5	19	11	5	0	5
	Erysipelas	8	3	10	0	3	3	2	3	2	0	0	5	0	7
	Fever, intermittent	14	5	3	0	5	11	2	6	0	0	14	16	3	7
	Fever, remittent	9	4	2	2	8	8	5	9	0	0	3	5	0	5
	Fever, typhoid (enteric)	13	5	2	2	3	0	17	9	7	0	8	5	3	5
	Fever, typho-malarial	2	1	0	4	0	0	0	3	0	8	3	0	0	0
	Influenza	36	26	49	56	41	19	17	3	0	4	11	8	31	36
	Kidney, inflammation of	18	24	29	30	27	22	26	18	5	23	22	29	37	19
	Measles	6	19	16	22	16	19	52	44	26	12	0	0	11	2
	Neuralgia	43	40	62	50	51	56	31	29	2	23	31	45	40	43
	Pleuritis	12	13	13	16	8	22	10	21	5	4	8	18	20	14
	Pneumonia	16	18	29	28	16	22	14	15	7	19	11	8	20	17
	Puerperal fever	2	1	3	0	3	0	0	0	0	0	3	0	3	2
	Rheumatism	56	59	67	66	70	81	57	53	29	50	50	68	69	50
	Scarlet fever	10	20	32	30	8	28	29	9	5	19	3	18	20	33
	Smallpox	1	2	0	0	0	0	0	0	0	0	0	0	6	14
	Tonsillitis	36	41	40	40	49	61	52	32	19	19	33	29	37	67
	Whooping-cough	5	6	5	6	0	0	12	6	10	4	0	0	3	21

*, †, d. These notes are on the first page of Table 5.

TABLE 6.—*A summary for the year 1902, relative to diseases in each of the 11 divisions of the State,—indicating the prevalence as regards both time and area.*

Diseases.	Upper Peninsular Division.*				Northwestern Division.*				Northern Division.*				Northeastern Division.*				Western Division.*			
	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e
Av. for tab. dis. reported present	22	60	13	2.5	32	73	25	3.3	29	61	18	2.3	35	83	30	3.2	24	60	15	2.2
Brain, inflammation of	1	80	1	3.0	4	25	1	5.3	1	33	.3	3.0	10	38	4	5.0	3	24	.6	3.3
Bowels, inflammation of	12	34	4	2.8	29	57	18	4.7	16	69	8	2.5	79	63	52	4.1	12	51	6	1.9
Bronchitis	53	64	34	2.4	75	89	69	3.0	76	71	55	2.0	97	93	92	2.1	58	67	39	2.4
Meningitis	11	61	7	3.9	7	36	3	4.8	5	29	1	3.0	0	0	0	0	3	27	.9	3.6
Cholera infantum	15	46	8	2.4	11	61	17	2.4	15	49	7	2.4	10	46	5	3.0	10	46	5	2.3
Cholera morbus	9	34	3	2.4	24	53	13	3.9	15	33	5	2.4	14	65	9	2.5	9	30	3	2.6
Consumption, pulmonary	40	88	36	2.4	45	93	42	2.6	29	77	22	2.1	0	0	0	0	15	54	8	2.0
Croup. membranous	3	23	.7	2.3	0	0	0	0	3	25	.6	3.0	0	0	0	0	.6	25	.2	3.0
Diphtheria	23	61	15	2.3	11	35	4	4.7	9	38	4	2.6	14	31	3	2.3	9	51	5	1.9
Diarrhea	38	62	24	1.8	67	72	49	3.3	60	63	38	2.4	66	73	50	3.5	45	51	24	2.3
Dysentery	11	35	4	3.3	20	30	6	3.3	15	51	8	2.5	10	54	6	4.7	8	32	3	1.7
Erysipelas	58	36	2	3.8	32	59	19	4.8	30	41	12	2.8	48	82	42	4.4	35	50	18	2.4
Fever, intermittent	0	0	0	0	25	81	21	2.4	24	55	13	2.4	0	0	0	0	25	56	14	1.7
Fever, remittent	1	25	.2	1.0	3	67	2	3.0	18	50	9	1.6	38	81	29	2.7	20	62	12	2.7
Fever, typhoid (enteric)	30	63	19	2.7	19	52	11	4.5	19	68	13	2.5	7	89	7	5.0	12	47	6	2.2
Fever, typho-malarial	0	0	0	0	3	50	1	2.5	4	50	2	3.7	0	0	0	0	6	50	3	2.4
Influenza	24	59	15	2.4	65	78	51	3.2	53	61	33	1.9	76	96	75	1.4	57	75	43	1.7
Kidney, inflammation of	15	43	6	2.8	48	75	39	4.4	40	44	18	3.0	90	81	72	3.1	19	39	7	2.3
Measles	14	70	11	2.7	4	42	2	2.3	9	37	3	2.0	0	0	0	0	16	43	7	1.7
Neuralgia	41	48	20	3.0	80	85	69	2.8	83	77	65	1.9	97	94	93	2.7	73	73	53	2.0
Pleuritis	16	53	9	3.0	56	63	37	4.6	41	72	31	2.9	86	88	77	3.9	21	40	9	2.8
Pneumonia	46	50	24	2.9	39	70	27	3.4	41	64	28	2.5	38	83	33	3.5	27	43	12	2.5
Puerperal fever	3	31	1	5.3	1	20	.3	2.0	10	31	3	2.8	0	0	0	0	4	41	2	2.4
Rheumatism	70	70	48	2.0	83	95	79	2.5	79	70	56	1.9	97	98	97	2.4	75	77	59	1.7
Scarlet fever	34	74	26	2.2	44	64	29	2.8	24	43	10	2.0	10	25	2	4.0	19	45	9	2.1
Smallpox	27	60	17	2.5	13	53	6	1.8	18	40	7	2.2	7	86	5	2.0	19	58	11	2.0
Tonsillitis	52	59	31	2.6	81	81	68	3.3	80	62	50	2.3	97	90	88	3.5	65	71	46	2.5
Whooping-cough	10	53	5	2.9	17	67	12	3.1	11	71	8	2.3	3	40	2	5.0	9	37	3	1.7

TABLE 6.—CONCLUDED.

Diseases.	Northern Central Division.*				Bay and Eastern Division.*				Central Division.*				Southwestern Division.*				Southern Central Division.*				Southeastern Division.*			
	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e
Av. for tab. dis. rep. present..	20	59	12	2.9	22	59	13	2.9	26	67	18	3.2	30	69	21	3.2	25	68	17	3.0	25	60	15	2.2
Brain, inflammation of.........	4	27	1	2.0	2	25	.5	5.5	3	39	1	8.2	7	44	3	4.5	3	31	.9	3.3	4	25	1	2.4
Bowels, inflammation of.......	12	29	4	3.7	23	41	9	4.2	17	49	9	4.8	28	50	14	4.1	18	39	7	3.9	22	40	9	2.7
Bronchitis......................	47	74	35	2.6	46	72	33	2.3	61	79	48	2.6	77	78	61	2.7	61	80	49	2.5	66	73	49	2.2
Meningitis......................	4	31	1	4.3	3	25	.7	5.4	1	50	.7	6.3	0	0	0	0	1	43	.6	4.3	2	46	1	2.7
Cholera infantum..............	9	47	5	2.1	9	62	5	3.4	8	44	4	3.5	15	48	7	4.0	13	49	6	3.5	5	28	1	2.8
Cholera morbus................	8	39	4	2.3	17	46	7	2.9	17	54	9	3.0	22	54	12	3.2	21	59	13	3.2	15	47	7	2.4
Consumption, pulmonary......	25	70	18	3.4	17	54	10	2.7	26	84	22	3.3	27	89	24	5.5	23	83	20	3.3	25	67	16	2.2
Croup, membranous............	2	25	.6	2.5	1	38	.4	4.5	2	25	.4	4.0	0	0	0	0	1	44	.4	4.5	5	36	2	3.0
Diphtheria......................	11	48	6	4.4	9	33	3	3.5	11	53	6	4.6	4	32	1	5.0	4	30	1	3.3	13	40	6	2.1
Diarrhea.........................	44	54	24	3.2	42	59	24	2.6	51	64	34	3.0	66	73	48	3.0	55	65	36	2.7	56	58	33	2.2
Dysentery	8	24	2	3.4	19	41	7	4.2	21	45	10	3.1	20	37	7	3.4	17	46	8	3.7	12	35	4	2.1
Erysipelas	13	43	6	3.4	20	54	11	3.9	10	65	7	4.2	9	29	3	4.9	15	46	7	4.2	8	38	3	2.2
Fever, intermittent......	21	67	14	1.3	15	50	7	3.9	25	52	13	3.4	50	69	33	2.9	23	52	13	3.6	16	33	5	2.4
Fever, remittent...............	8	15	2	2.0	9	43	4	4.8	23	51	12	3.7	20	44	9	3.7	10	35	4	3.4	18	41	4	2.6
Fever, typhoid (enteric).......	18	65	12	2.7	13	71	9	2.2	24	70	18	3.5	20	65	14	4.5	18	59	10	3.5	12	43	5	1.8
Fever, typho-malarial..........	1	25	.3	4.0	3	58	1	3.2	4	41	2	4.5	5	47	2	4.9	3	56	2	4.0	3	40	1	3.3
Influenza..............	28	78	23	2.6	37	58	21	2.2	58	78	45	2.3	63	73	47	1.9	50	80	42	2.1	40	64	26	1.9
Kidney, inflammation of.......	26	37	10	3.3	31	63	19	3.8	28	58	17	4.4	38	60	23	3.5	24	55	14	4.2	36	68	24	2.8
Measles.........................	16	48	8	2.4	10	64	7	2.0	27	67	18	3.1	7	61	5	3.1	18	53	10	2.7	29	64	19	1.8
Neuralgia.......................	51	69	36	2.6	52	74	38	2.3	69	76	52	2.6	74	86	64	2.5	74	85	64	2.5	63	63	40	2.3
Pleuritis	18	49	9	3.3	36	49	18	3.5	21	54	11	4.3	35	66	24	3.9	36	47	17	4.0	29	43	13	2.9
Pneumonia.......................	29	42	12	3.4	42	51	21	3.1	30	55	17	3.9	34	60	21	4.7	34	52	17	3.6	31	54	18	2.4
Puerperal fever	4	33	1	2.0	4	29	1	3.4	3	37	1	2.8	11	34	4	2.9	2	25	.4	2.5	5	26	1	2.0
Rheumatism.....................	64	79	50	1.6	53	75	39	2.2	72	82	59	2.3	82	86	70	2.1	75	88	68	2.2	75	78	59	1.9
Scarlet fever...................	19	65	12	3.6	23	55	13	2.5	22	60	13	3.8	23	52	13	3.7	17	61	11	4.1	31	61	20	1.9
Smallpox	20	67	14	4.2	10	65	7	2.5	21	65	15	3.6	1	40	.7	5.0	4	53	2	3.7	2	62	2	2.7
Tonsillitis......................	44	66	29	3.4	56	63	35	2.4	64	69	45	2.8	78	79	62	3.1	69	75	52	2.7	64	63	41	2.3
Whooping-cough................	13	65	9	3.2	12	41	5	2.0	12	65	8	3.3	11	68	8	2.7	12	71	9	2.1	10	56	6	2.3

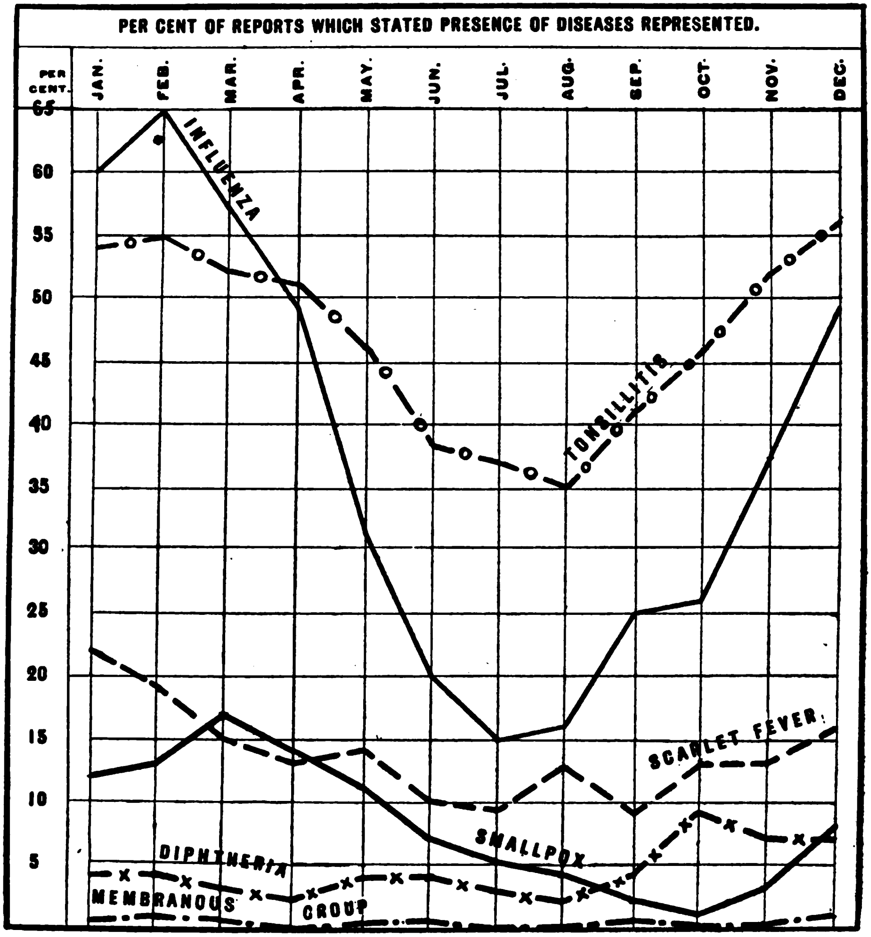
* Counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886. b, c, d, e. Foot-notes with these marks are below the first part of Table 5.

DISEASES IN MICHIGAN, ARRANGED IN ORDER OF PREVALENCE, THOSE WHICH CAUSED MOST SICKNESS FIRST.

TABLE 7.—*Order of prevalence of 28 diseases in Michigan, in the period of 11 years, 1892-1902, and in each of those years; also the average order for the 10 years, 1892-1901; judging from the "per cent of reports," which stated the presence of each of the diseases, in connection with the reported "order of prevalence" when and where each disease was present. The diseases are arranged in the order of greatest prevalence in the 10 years, 1892-1901. (The method of rating diseases for this table is described and illustrated in a "compiling table" on pages 122 and 123 of the annual report for 1890.)*

Order, 1892-1901.	Diseases arranged in order of greatest prevalence.	1902.	1901.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	Av. 10 years, 1892-1901.
1	Rheumatism	1	1	1	1	1	1	1	3	1	1	2	1
2	Neuralgia	2	3	2	3	3	3	2	1	2	2	1	2
3	Influenza	4	2	3	2	2	2	3	2	4	3	4	3
4	Bronchitis	3	4	4	4	4	4	4	4	3	4	3	4
5	Diarrhea	6	6	5	6	5	6	6	5	5	6	5	6
6	Tonsillitis	5	5	6	5	6	5	5	6	6	5	6	6
7	Intermittent fever	10	10	11	9	8	10	8	7	8	7	7	9
8	Consumption, pul.	9	8	9	7	10	11	7	10	7	8	9	9
(9)	(The average disease)	7	8	10	8	9	10	7	8	9	10	9	(9)
9	Whooping-cough	8	14	7	10	9	8	11	8	10	11	10	10
10	Measles	7	9	8	8	11	7	14	18	11	10	16	11
11	Remittent fever	20	19	17	19	12	20	9	9	9	9	8	13
12	Cholera morbus	15	11	12	12	23	14	12	11	12	13	14	13
13	Cholera infantum	18	16	13	17	14	13	17	12	15	15	15	15
14	Dysentery	21	17	16	11	15	16	13	13	13	17	17.	15
15	Pneumonia	11	15	20	16	18	18	10	16	16	12	11	15
16	Scarlet fever	12	7	14	18	13	19	18	19	14	19	13	15
17	Inflam. of kidney	17	18	18	14	17	21	16	14	17	16	12	16
18	Typhoid fever (ent.)	14	13	10	13	16	25	19	17	18	14	20	17
19	Typho-malarial fever	25	26	19	15	24	12	21	20	23	22	22	20
20	Pleuritis	19	21	21	20	19	26	15	21	22	20	19	20
21	Smallpox	13	12	15	28	7	9	28	15	26	28	28	20
22	Diphtheria	22	23	25	24	22	15	24	27	19	18	18	22
23	Erysipelas	23	25	26	23	20	22	20	23	21	21	21	22
24	Inflam. of bowels	24	24	24	21	21	23	22	22	20	23	23	22
25	Puerperal fever	16	20	23	25	25	24	23	24	24	24	26	24
26	Meningitis	27	22	27	22	26	28	25	25	25	27	24	25
27	Membranous croup	26	28	28	27	28	17	26	28	27	25	27	25
28	Inflam. of brain	28	27	22	26	27	27	27	26	28	26	25	26

DIAGRAM 2—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1902.



[PLATE 1185.]

Diseases which cause most sickness in Michigan.—This is shown in Table 7, and more specifically in Table 9, in this report, and in similar tables or "exhibits" in previous reports. The question is differently answered in different years. For many years after the compilation of weekly reports was begun, intermittent fever was the leading cause of sickness in Michigan.

By Table 7, one may see that in the year 1892 neuralgia, in 1893-94 rheumatism, in 1895 neuralgia, and in 1896-1902 rheumatism appeared to have caused most sickness in Michigan. This does not necessarily imply that there was an increase in rheumatism or neuralgia, because one disease *may* exhibit a higher relative order of prevalence on account of some other disease or diseases having been actually lessened in prevalence.

The "average disease" of those reported, is included in Table 7, as a standard by which to judge the fluctuations. "Average disease" is explained near the close of this article. It may be seen that in 1892, the "average disease" was the same (9) as the average of the ten preceding years. In 1893 it was one-tenth lower than the ten year average; in 1894 it was raised to the ten year average; in 1895 it was one-tenth higher, and in 1896 it was two-tenths higher; in 1897 it was one-tenth lower; in 1898 it was raised to the ten year average; in 1899 it was one-tenth higher; in 1900 it was one-tenth lower; in 1901 it was two-tenths higher; and in 1902 it was the same as the average for the preceding ten years.

In this connection it should be stated that the average number of diseases reported on each card show an almost continuous decrease during the years 1892-1902. This is shown in Table 8, as follows:—

TABLE 8.—*Stating for each of the 11 years, 1892-1902, the number of card reports received, the total number of disease reports and the average number of diseases reported on each card; also the average for the 10 years, 1892-1901.*

Year.	Number of card reports received.	Number of disease reports.	Av. number of diseases on each card.
1892	5,281	31,269	5.92
1893	5,853	32,723	5.59
1894	5,572	30,619	5.50
1895	4,394	24,004	5.46
1896	3,940	19,443	4.93
1897	4,418	21,828	4.94
1898	5,219	24,946	4.78
1899	5,126	24,700	4.82
1900	5,513	28,463	5.34
1901	5,850	28,941	4.95
Average 10 years, 1892-1901	5,117	26,694	5.22
1902	5,979	28,087	4.70

TABLE 9.—*Diseases from which there seems to have been the most sickness in Michigan in 1902, as indicated by the per cent of weekly reports stating presence of the diseases, as studied in connection with the average order of prevalence of said diseases when reported present; also order, per cent of reports and average order for the same diseases in 1901, 1900, 1899, and 1898.*

	1902.				1901.			1900.			1899.			1898.		
	Order.*	Diseases in order of apparent amount of sickness in 1902. Most prevalent disease first.	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e
More sickness than av. for 28 diseases.	1	Rheumatism	59	2.1	1	61	2.3	1	63	2.3	1	63	2.3	1	62	2.2
	2	Neuralgia	52	2.4	3	57	2.5	2	56	2.5	3	56	2.4	3	54	2.3
	3	Bronchitis	47	2.5	4	50	2.6	4	49	2.6	4	50	2.5	4	49	2.5
	4	Influenza	37	2.1	2	44	1.9	3	40	2.1	2	42	1.7	2	45	1.7
	5	Tonsillitis	47	2.7	5	46	2.9	6	45	2.9	5	42	2.7	6	40	2.7
	6	Diarrhea	33	2.7	6	36	2.6	5	40	2.4	6	37	2.5	5	36	2.4
	(7)	Average	17	2.8	(8)	18	2.9	(10)	18	2.8	(8)	17	2.8	(9)	17	2.6
Less than said average.	7	Measles	10	2.5	9	5	2.5	8	13	2.4	8	6	2.3	11	7	2.7
	8	Whooping-cough	7	2.5	14	5	2.8	7	5	2.5	10	4	2.3	9	5	2.4
	9	Consumption, pulmonary	20	3.1	8	22	3.1	9	25	3.0	7	22	2.9	10	20	2.9
	10	Intermittent fever	13	2.9	10	14	3.0	11	16	2.9	9	17	2.9	8	19	2.6
	11	Pneumonia	19	3.3	15	20	3.5	20	16	3.6	16	17	3.5	18	17	3.2
	12	Scarlet fever	14	3.0	7	14	2.7	14	12	3.0	18	8	3.1	13	5	2.7
	13	Smallpox	8	2.9	12	7	2.8	15	1	2.7	28	.4	4.7	7	.04	2.0
	14	Typhoid fever	12	3.2	13	13	3.1	10	15	2.8	13	9	2.9	16	8	2.9
	15	Cholera morbus	8	3.0	11	10	2.9	12	14	2.9	12	10	2.9	23	12	2.7

* Judging from the per cent of reports which stated presence of the disease in connection with the order of prevalence when present. The method of rating diseases, as causes of sickness, is fully described and illustrated by a "compiling table" on pages 122 and 123 of the annual report for the year 1890.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received, for the time specified, from *all observers* in the State. It combines and states in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence.

e The disease having the greatest number of cases was to be marked 1, in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals of the order of prevalence columns in Table 3 (omitted from this report because of lack of room), by the number of observers who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "average" lines for this column are found by dividing the sum of the totals in the order of prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of observers, who reported the different diseases present, thus counting each observer once for every disease he reported present. As a rule, small numbers in this column indicate the large prevalence of the disease, and *vice versa;* but the greater the number of diseases reported present, by each observer, from week to week, the greater will be the average in this column.

TABLE 10.—*In each of 11 geographical divisions of the State the 15 diseases from which there seems to have been the greatest amount of sickness in 1902, as indicated by the per cent of weekly reports stating presence of each of 28 leading diseases, when studied in connection with the average order of prevalence of said diseases when reported present.*

	Order.*	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when present.e	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when present.e	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when present.e
		UPPER PENINSULAR DIVISION.†			NORTHWESTERN DIVISION.†			NORTHERN DIVISION.†		
More sickness than av. for 28 diseases.	1	Rheumatism..........	48	2.0	Rheumatism..........	79	2.5	Neuralgia..........	65	1.9
	2	Consumption, pul....	36	2.4	Neuralgia............	69	2.8	Rheumatism........	56	1.9
	3	Bronchitis............	34	2.4	Bronchitis............	69	3.0	Bronchitis..........	55	2.0
	4	Tonsillitis	31	2.2	Tonsillitis	68	3.	Tonsillitis	50	2.3
	5	Diarrhea	24	1.8	Consumption, pul....	42	2.6	Influenza...........	33	1.9
	6	Scarlet fever........	26	2.2	Influenza............	51	3.2	Diarrhea	38	2.4
	7	Pneumonia...........	24	2.9	Diarrhea.............	49	3.3	Remittent fever..	9	1.6
	8	Diphtheria...........	15	2.3	Intermittent fever..	21	2.4	Consumption, pul..	22	2.1
	9	Smallpox	17	2.5	Scarlet fever........	25	2.8	Pneumonia.........	28	2.5
	10	Remittent fever.....	2	1.0	Smallpox.............	6	1.8	Scarlet fever......	10	2.0
	(11)	....	....	....	....	....	....	Average	18	2.3
Less than said average.	11	Typhoid fever.......	19	2.7	Puerperal fever.....	3	2.0	Pleuritis...........	31	2.9
	12	Influenza.............	15	2.4	Cholera infantum....	7	2.4	Measles	3	2.0
	(13)	....	....	....	Average..............	25	3.3	....	....	....
	13	Neuralgia............	20	3.0	Pneumonia...........	27	3.4	Smallpox	7	2.2
	(14)	Average	13	2.5	....	....	....	....	....	....
	14	Cholera infantum....	8	2.4	Measles	2	2.3	Intermittent fever	13	2.4
	15	Measles	11	2.7	Typho-mal. fever....	1	2.5	Whooping-cough ..	8	2.3
		NORTHERN CENTRAL DIVISION.†			WESTERN DIVISION.†			NORTHEASTERN DIVISION.†		
More sickness than av. for 28 diseases.	1	Rheumatism..........	50	1.6	Rheumatism	59	1.7	Influenza...........	75	1.4
	2	Neuralgia............	36	2.6	Neuralgia........	53	2.0	Bronchitis..........	92	2.1
	3	Bronchitis............	35	2.6	Influenza.............	43	1.7	Rheumatism	97	2.4
	4	Intermittent fever..	14	1.3	Tonsillitis	46	2.5	Neuralgia..........	93	2.7
	5	Influenza	23	2.6	Bronchitis............	39	2.4	Tonsillitis	88	3.5
	6	Tonsillitis............	29	3.4	Intermittent fever..	14	1.7	Inflam. of kidney..	72	3.1
	7	Diarrhea..............	24	3.2	Measles	7	1.7	Pleuritis............	77	3.9
	8	Cholera infantum....	5	2.1	Diarrhea..............	24	2.3	Remittent fever...	29	2.7
	9	Remittent fever.....	2	2.0	Whooping-cough	3	1.7	Diarrhea............	50	3.5
	(10)	....	....	....	....	....	....	Average	30	3.2
Less than said average.	10	Measles	8	2.4	Dysentery	3	1.7	Inflam. of bowels..	52	4.1
	11	Puerperal fever......	1	2.0	Smallpox.............	11	2.0	Cholera morbus....	9	2.5
	12	Inflam. of brain......	1	2.0	Inflam. of bowels....	6	1.9	Diphtheria..........	8	2.3
	(13)	....	....	....	Average	15	2.2	....	....	....
	13	Typhoid fever	12	2.7	Diphtheria.......	5	1.9	Pneumonia.........	33	3.5
	14	Cholera morbus......	4	2.3	Consumption, pul....	8	2.0	Erysipelas..........	42	4.4
	(15)	Average.............	12	2.9	....	....	....	....	....	....
	15	Consumption, pul....	18	3.4	Scarlet fever........	9	2.1	Cholera infantum..	5	3.0

TABLE 10.—CONCLUDED.

	Order.*	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when present.e	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when present.e	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when present.e
		BAY AND EASTERN DIVISION.†			CENTRAL DIVISION.†			SOUTHWESTERN DIVISION.†		
More sickness than av. for 28 diseases.	1	Rheumatism	39	2.2	Rheumatism	59	2.3	Rheumatism	70	2.1
	2	Neuralgia	38	2.3	Neuralgia	52	2.6	Neuralgia	64	2.5
	3	Tonsillitis	35	2.4	Bronchitis	48	2.6	Influenza	47	1.9
	4	Bronchitis	33	2.3	Influenza	45	2.3	Bronchitis	61	2.7
	5	Influenza	21	2.2	Tonsillitis	45	2.8	Tonsillitis	62	3.1
	6	Diarrhea	24	2.6	Diarrhea	34	3.0	Diarrhea	48	3.0
	7	Pneumonia	21	3.1	Consumption, pul	22	3.3	Intermittent fever	33	2.9
	(8)	....	....	....	....	....	....	Average	21	3.2
Less.	8	Scarlet fever	13	2.5	Measles	18	3.1	Whooping-cough	8	2.7
	(9)	....	....	....	Average	18	3.2	....	....	....
	9	Measles	7	2.0	Typhoid fever	18	3.5	Inflam. of kidney	23	3.5
	10	Typhoid fever	9	2.2	Intermittent fever	13	3.4	Cholera morbus	12	3.2
	11	Whooping-cough	5	2.0	Dysentery	10	3.1	Pleuritis	24	3.9
	(12)	Average	13	2.9	....	....	....	....	....	....
	12	Consumption, pul	10	2.7	Cholera morbus	9	3.0	Puerperal fever	4	2.9
	13	Smallpox	7	2.5	Smallpox	15	3.6	Measles	5	3.1
	14	Pleuritis	18	3.5	Pneumonia	17	3.9	Scarlet fever	13	3.7
	15	Inflam. of kidney	19	3.8	Scarlet fever	13	3.8	Dysentery	7	3.4
		SOUTHERN CENTRAL DIVISION.†			SOUTHEASTERN DIVISION.†					
More sickness than av. for 28 diseases.	1	Rheumatism	68	2.2	Rheumatism				59	1.9
	2	Neuralgia	64	2.5	Bronchitis				49	2.2
	3	Influenza	42	2.1	Influenza				26	1.9
	4	Bronchitis	49	2.5	Tonsillitis				41	2.3
	5	Tonsillitis	52	2.7	Neuralgia				40	2.3
	6	Diarrhea	36	2.7	Measles				19	1.8
	7	Whooping-cough	9	2.1	Diarrhea				33	2.2
	8	Measles	10	2.7	Scarlet fever				20	1.9
	(9)	Average	17	3.0	....				....	....
Less.	9	Puerperal fever	4	2.5	Typhoid fever				5	1.8
	10	Consumption, pul	20	3.3	Consumption, pulmonary				16	2.2
	(11)	....	....	....	Average				15	2.2
	11	Cholera morbus	13	3.2	Pneumonia				18	2.4
	12	Pneumonia	17	3.6	Diphtheria				6	2.1
	13	Intermittent fever	13	3.6	Puerperal fever				1	2.0
	14	Typhoid fever	10	3.5	Dysentery				4	2.1
	15	Remittent fever	4	3.4	Erysipelas				3	2.2

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*, d, e. Foot-notes with these marks are under Table 9.

†The counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

TABLE 11.—*Showing comparisons between the averages of certain meteorological conditions at stations in Michigan in 1902, with those in preceding years. (Abstracted from the article on Principal Meteorological Conditions in Michigan, on preceding pages of this report.)*

Meteorological conditions.		Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.
Average temperature	In 1902 higher than av. for 10 years, 1892-1901	......	.30	......	6.8	......	......	......	......	......	......	......	8.21	......
	Lower	.20	......	.27	......	1.18	.06	6.45	.94	4.11	3.01	1.03	......	.63
Av. daily range of temp.	In 1902 greater than av. for 10 years, 1892-1901	......	......	.42	......	......	......	......	......	......	......	......	.07	......
	Less	1.02	.38	......	.17	.85	.07	2.66	2.13	1.60	3.13	.36	......	1.44
Absolute humidity	In 1902 more than av. for 10 years, 1892-1901	......	......	......	.38	......	......	......	.33	......	......	......	.65	......
	Less	.11	.12	.12	......	.29	.02	.82	......	.51	.38	.20	......	.18
Relative humidity	In 1902 more than av. for 10 years, 1892-1901	2	......	......	......	......	1	6	9	4	......	=	......	=
	Less	......	2	2	2	1	......	......	......	......	6	=	1	=
Cloudiness	In 1902 greater than av. for 10 years, 1892-1901	3	......	......	......	5	......	18	13	1	16	6	......	5
	Less	......	5	11	6	......	1	......	......	......	......	......	3	......
Rainfall	In 1902 more than av. for 10 years, 1892-1901	3.34	......	......	.27	......	.14	2.13	3.25	......	1.60	......	......	.04
	Less	......	1.39	.87	......	.55	......	......	......	.82	......	.15	.33	......
Day ozone	In 1902 more than av. for 10 years, 1892-1901	.06	......	......	......	.26	.11	.53	.22	......	.02	......	......	.06
	Less	......	.07	.02	.16	......	......	......	......	.01	......	.06	.19	......
Night ozone	In 1902 more than av. for 10 years, 1892-1901	......	......	......	......	.22	.14	.32	.20	......	......	.15	......	.15
	Less	.02	.27	.12	.29	......	......	......	......	.47	.09	......	.10	......
Velocity of wind	In 1902 greater than av. for 10 years, 1892-1901	.9	.9	......	.3	1.7	.4	2.2	.2	.3	.5	1.4	.6	2.1
	Less	......	......	.2	......	......	......	......	......	......	......	......	......	......
Atmospheric pressure	In 1902 greater than av. for 10 years, 1892-1901	......	.093	......	......	......	.087	......	......	......	......	......	......	.029
	Less	.010	......	.053	.013	.087	......	.064	.021	.012	.057	.005	.024	......

TABLE 12.—BRONCHITIS.—*Stating for the year and for each month of the year 1902, what per cent of the weekly reports of sickness stated presence of bronchitis, and what were the meteorological conditions as observed at stations in Michigan.**

	Bronchitis.			Temperature, F.		Humidity of air.§ Av. of 3 daily observations.		Vapor inhaled and exhaled from the air passages by one person in 24 hours, troy ounces.			Ozone, relative. Scale of 10°.			Atmospheric pressure, inches. Reduced to 32° F.		
														Range.		
	Months in order of greatest per cent of weekly reports stating presence of.	Per cent of weekly reports stating presence of.	Av. order of prevalence where present. †‡	Av. daily range by registering thermometers.	Average of three daily observations.	Relative per cent of saturation.	Absolute—grains of vapor in a cubic foot of air.	Inhaled. ‖	Exhaled in excess of that inhaled. ¶	Average per cent of cloudiness.	Day observation, 7 A. M. to 2 P. M.	Night observation, 9 P. M. to 7 A. M.	Av. velocity of wind, miles per hour by anemometer.	Monthly and for year.	Av. daily by 3 daily observations.**	Average pressure.
More than av. per cent of bronchitis.	Feb....	65	2.4	16.30	21.11	80	1.26	.79	10.89	*a* 55	4.12	4.42	10.7	1.564	.206	29.040
	Jan....	61	2.2	14.07	22.93	81	1.33	.83	10.85	67	3.95	*a* 3.76	11.9	1.187	.263	*b* 29.180
	Mar.. .	60	2.4	16.63	37.45	*a* 78	2.24	1.40	10.28	*a* 51	4.07	4.36	11.8	1.301	.208	29.078
	Dec....	55	2.2	11.28	26.41	83	1.53	.96	10.72	78	*a* 3.60	4.21	12.9	1.191	.254	*b* 29.129
	April. .	54	2.4	*b* 17.75	44.95	*a* 72	2.68	1.68	10.00	*a* 57	4.01	4.54	12.2	1.087	.225	29.041
	Nov....	50	2.5	13.73	44.42	80	2.98	1.86	9.82	68	*a* 3.05	*a* 3.50	11.6	*a* .808	.207	*b* 29.101
	Av.......	47	2.8	16.80	46.80	79	3.44	2.15	9.53	58	3.74	4.04	10.7	.954	.196	29.097
Less than av. per cent of bronchitis.	Oct....	45	2.6	17.85	49.54	77	*b* 3.41	2.13	9.55	56	3.12	3.53	*a* 11.1	*a* 1.049	*a* .250	29.134
	May...	42	2.5	19.70	57.06	75	4.19	2.62	9.06	52	*a* 4.21	*a* 4.76	10.0	.638	.168	29.144
	Sept...	43	2.7	17.16	59.54	*a* 80	4.67	2.92	8.76	*a* 59	3.09	3.22	9.5	.690	.155	*b* 29.093
	June...	34	2.6	18.65	61.53	79	4.92	3.08	8.60	*a* 59	*a* 4.27	*a* 4.63	10.3	.825	.177	*b* 29.029
	Aug....	32	3.1	19.32	65.62	78	5.48	3.43	8.25	41	*a* 4.04	3.80	7.8	.570	.123	29.103
	July....	31	2.6	19.11	71.09	*a* 81	6.58	4.11	7.57	52	3.38	3.82	8.2	.540	.115	*b* 29.086

***Statements relative to meteorological conditions may be found in an article on the principal meteorological conditions in Michigan in 1902, on preceding pages of this report.**

†Explanations of statements in this and the preceding columns, and other statements relative to the prevalence in 1902, of the diseases under consideration, may be found in Tables 5 and 6 of this article, and also in Diagrams 1, 2, 3, 4 and 5. When the per cent of reports stated for any disease is the same for two months or for any month is the same as the average, the order of months in the first column of these exhibits has been determined by reference to fractional per cents.

‡Small numbers in this column indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers a less prevalence.

§Calculated from readings of dry bulb and wet bulb thermometers.

‖Calculated for 18 respirations per minute, of 20 cubic inches of air each.

¶Assuming the air exhaled to be saturated with vapor at the temperature of 98° F., in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations per minute, of 20 cubic inches of air each, make 11.68 troy ounces of vapor exhaled daily. No correction has been made for the expansion of air after it is inhaled.

****The daily range from which numbers in this column were computed is the difference between the highest and the lowest of the four observations taken during the 24 hours, namely, at 7 a. m., 2 p. m., 9 p. m. of one day, and 7 a. m. of the following day.**

***a*An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was greater than the average for the year, and less in months when the same condition was less than the average. Proposition 1. relating to bronchitis and other "cold-weather" diseases, is on a preceding page in this article.**

***b*An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was less than the average for the year, and less in months when the same condition was greater than the average for the year. Proposition 2, relating to bronchitis and other "cold-weather" diseases, is on a preceding page in this article.**

TABLE 13.—*By year and months for 1902, and for the preceding year, and an average for the 10 years, 1892-1901, stating on what per cent of the weekly reports received* Pneumonia, Membranous Croup, Diphtheria, Rheumatism, Influenza, Scarlet Fever, Neuralgia, Tonsillitis, Bronchitis, Inflammation of Kidney, Meningitis, Pleuritis, Consumption, Puerperal Fever, Erysipelas and Smallpox, *were reported present; and comparing the per cents for months in 1902 with the averages for corresponding months in the years specified. (The per cent of increase or decrease of any disease in 1902, when compared with the average for the preceding 10 years, may be found by multiplying the difference by 100, and dividing the product by the figure representing the average.)*

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pneumonia.	Av. 10 years, 1892-1901	20	36	38	35	29	20	11	7	5	7	11	18	23	Membr. croup.	1	2	2	1	2	1	.6	.6	.4	.6	1	2	2
	1901	20	30	39	37	32	24	16	4	3	5	12	17	21		.4	1	.4	.4	.5	.5	0	0	0	0	.5	.7	.6
	1902	19	32	35	32	26	19	10	9	4	9	10	20	27		.5	5	1	.7	0	.4	.7	0	.2	.4	.4	.4	.9
	In 1902 greater than av. 1892-1901	..	..	..	..	..	..	..	2	..	2	..	2	4		..	...	..	..	..	..	.1	...	...	...	...	...	...
	In 1902 less than av. 1892-1901	1	4	3	3	3	1	1	..	1	..	1	..	..		.5	1.5	1	.3	2	.6	...	.6	.2	.2	.6	1.6	1.1
Diphtheria.	Av. 10 years, 1892-1901	5	6	5	5	4	4	5	3	4	4	7	8	7	Rheumatism.	63	65	65	68	67	65	61	58	56	58	62	63	64
	1901	5	6	4	4	2	4	4	5	3	4	6	9	5		61	63	64	66	63	65	59	56	55	57	58	63	62
	1902	5	4	4	3	2	4	4	3	2	4	9	7	7		59	63	65	66	62	58	56	55	57	59	57	57	59
	In 1902 greater than av. 1892-1901	=	..	..	..	..	=	..	=	..	=	2	..	=		..	...	=	..	..	..	...	...	1	1	...	...	...
	In 1902 less than av. 1892-1901	=	2	1	2	2	=	1	=	2	=	..	1	=		4	2	=	2	5	7	5	3	...	...	5	6	5
Influenza.	Av. 10 years, 1892-1901	43	72	75	73	61	40	25	17	17	24	29	43	57	Scarlet fever.	10	12	11	11	12	10	9	7	7	8	9	12	12
	1901	44	74	83	76	63	43	28	15	13	21	27	44	52		14	13	20	18	14	13	12	11	10	11	14	13	18
	1902	37	60	65	57	49	31	20	15	16	25	26	37	49		14	22	19	15	13	14	10	9	13	9	13	13	16
	In 1902 greater than av. 1892-1901	..	..	..	..	..	..	..	..	..	1	..	..	..		4	10	8	4	1	4	1	2	6	1	4	1	4
	In 1902 less than av. 1892-1901	6	12	10	16	12	9	5	2	1	..	3	6	8		..	...	..	..	..	..	..	...	...	...	...	...	...
Neuralgia.	Av. 10 years, 1892-1901	57	62	63	65	63	58	53	49	48	50	55	58	58	Tonsillitis.	44	55	54	53	51	44	36	33	33	34	41	50	54
	1901	57	63	63	67	67	61	55	49	45	50	53	55	56		46	53	56	54	55	48	41	34	37	35	41	50	56
	1902	52	61	59	56	55	50	49	44	47	49	51	51	54		47	54	55	52	51	46	38	37	35	41	46	52	56
	In 1902 greater than av. 1892-1901	..	..	..	..	..	..	..	..	..	..	..	..	..		3	...	1	..	=	2	2	4	2	7	5	2	2
	In 1902 less than av. 1892-1901	5	1	4	9	8	8	4	5	1	1	4	7	4		..	1	..	1	=	..	...	...	...	...	...	...	...
Bronchitis.	Av. 10 years, 1892-1901	51	62	63	62	61	51	43	35	35	41	48	55	59	Inflam. of kidney.	18	20	20	20	22	21	19	18	16	15	17	19	17
	1901	50	58	59	63	60	52	47	34	32	43	46	54	58		20	19	23	24	22	23	21	16	14	16	20	18	20
	1902	47	61	65	60	54	42	34	31	32	43	45	50	55		18	23	26	24	20	16	15	13	15	18	15	16	17
	In 1902 greater than av. 1892-1901	..	..	2	..	..	..	..	..	..	2	..	..	..		=	3	6	4	..	..	...	...	...	3	...	...	=
	In 1902 less than av. 1892-1901	4	1	..	2	7	9	9	4	3	..	3	5	4		=	...	..	..	2	5	4	5	1	...	2	3	=

TABLE 13.—CONCLUDED.

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Meningitis.	Av. 10 years, 1892-1901	1	1	2	2	2	2	2	2	1	2	1	1	1	Pleuritis.	16	23	23	24	21	17	13	11	8	10	12	16	19
	1901	1	2	1	1	2	2	1	2	1	.9	.5	0	2		17	19	27	23	23	19	15	11	7	9	13	16	23
	1902	1	1	2	1	3	3	.4	.2	1	1	1	1	1		18	25	27	27	23	16	15	10	8	10	12	16	23
	In 1902 greater than av. 1892-1901	=	=	=	..	1	1	...	...	=	..	=	=	=		2	2	4	3	2	...	2	...	=	=	=	=	4
	In 1902 less than av. 1892-1901	=	=	=	1	..	..	1.6	1.8	=	1	=	=	=		..	...	..	..	..	1	...	1	=	=	=	=	...
Consumption.	Av. 10 years, 1892-1901	27	28	28	28	29	28	28	28	27	27	26	25	25	Puerperal fever.	2	3	3	3	4	3	3	2	2	3	2	2	2
	1901	22	22	25	25	26	22	20	20	21	23	23	18	20		2	2	2	4	5	4	1	1	2	3	.5	.7	1
	1902	20	22	20	20	20	19	19	19	19	19	21	20	19		1	3	3	1	1	1	.4	.8	1	2	1	.7	7
	In 1902 greater than av. 1892-1901	..	..	..	..	..	..	...	...	..	..	..	..	..		..	=	=	..	..	...	...	...	...	...	..	...	...
	In 1902 less than av. 1892-1901	7	6	8	8	9	9	9	9	8	8	5	5	6		1	=	=	2	3	2	2.6	1.2	1	1	1	1.3	1.3
Erysipelas.	Av. 10 years, 1892-1901	12	13	14	15	15	14	13	11	9	9	10	12	14	Smallpox.	1	.8	1	1	1	.9	1	.9	.7	.5	.6	1	2
	1901	9	10	13	13	15	12	10	7	5	6	5	8	10		7	6	6	6	7	6	10	7	6	5	3	9	10
	1902	9	12	10	8	11	9	8	10	7	6	9	9	13		8	12	13	17	14	11	7	5	4	2	1	3	8
	In 1902 greater than av. 1892-1901	..	..	..	..	..	..	...	...	..	..	..	..	..		7	11.2	12	16	13	10.1	6	4.1	3.3	1.5	.4	2	6
	In 1902 less than av. 1892-1901	3	1	4	7	4	5	5	1	2	3	1	3	1		..	...	..	..	..	...	...	...	...	...	..	...	...

The lines for 1902 in Tables 13 and 14, relative to the twenty-eight diseases, are graphically represented in Diagrams 1, 2, 3, 4 and 5 of this article.

Table 10 reveals the fact that the sickness from some diseases differs very much in the several divisions of the State. Thus in the Upper Peninsula consumption caused more sickness than any other disease except rheumatism; in the Northwestern Division it was fifth on the list; in the Northern, it was eighth; in the Northern Central Division it was fifteenth; and in the Northeastern and Southwestern Divisions it was not among the fifteen diseases which caused most sickness.

CLIMATE AND SICKNESS.*

Table 12 (and similar tables or "exhibits" in previous reports) is an attempt to learn something of the relations of bronchitis to meteorological conditions, by noting whether each meteorological condition was above or below its average for the year, in months when more or in months when less bronchitis than the average for the year was reported. The months are arranged in order according to the prevalence of bronchitis; those months in which most bronchitis was reported being placed first in the column; those in which more bronchitis than the average was reported are placed above the average line; the others below that line. The meteorological conditions for each month are printed, in the proper columns, in the line for the month. The statements being thus arranged, it is easy to see whether the temperature, the velocity of the wind, or any other condition represented, was above its annual average in months when more than the average amount of bronchitis was reported, or *vice versa.*

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* Footnote is at bottom of page 92.

That the comparisons may the more readily be held in mind, propositions have been made concerning the relations of bronchitis to meteorological conditions, grouping the conditions into two classes. The letters *a* and *b* in the table mark exceptions to these propositions. It is not supposed that the propositions are in every case true concerning the disease; but the propositions serve to bring out the evidence of the table on the subject in question. This evidence is appreciated by noting the number and force of the exceptions to the propositions, and also whether the exception is explained by facts shown in other columns. A summary of the evidence is presented in Table 15, near the close of this article.

Propositions similar to those relative to bronchitis, but relating to other diseases, are given on following pages. The propositions are differently stated for the summer diseases and for the winter diseases, but they are not changed to fit the individual diseases under each class.

*Relations of bronchitis and other "cold-weather" diseases to meteorological conditions.**

PROPOSITION 1.—That in months when more than the average per cent of weekly reports stated the presence of bronchitis, pneumonia, membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption, meningitis, erysipelas, inflammation of kidney, puerperal fever, smallpox, or average disease, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer, were greater than the average for the year; and in months when less than the average per cent of reports stated the presence of bronchitis (or of the other diseases named), these conditions were less than the average for the year. In Table 12, the letter *a* marks exceptions to this proposition relating to bronchitis for the year 1902.

PROPOSITION 2.—That in months when more than the average per cent of weekly reports stated the presence of bronchitis, pneumonia, membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption, meningitis, erysipelas, inflammation of kidney, puerperal fever, smallpox, or average disease, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere and the average daily pressure of the atmosphere were less than the average for the year; and in months when less than the average per cent of reports stated the presence of bronchitis (or of the other diseases named), these conditions were greater than the average for the year. In Table 12, the letter *b* marks exceptions to this proposition relating to bronchitis for months in 1902.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to proposition 2, it is true also that the quantity of vapor inhaled daily was less than the average, and the quantity exhaled daily in excess of that inhaled was greater than the average in months where more than the average per cent of reports stated presence of bronchitis, or of the other diseases named in propositions 1 and 2; and that **more** vapor was inhaled and a **less** excess exhaled daily in months when the per cent of reports stating presence of bronchitis, or of the other diseases named in propositions 1 and 2, was **less** than the average.

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*A comparison of meteorological conditions in 1902, with the averages for series of years, is given on a preceding page of this article.

What per cent of the weekly reports received stated presence of the diseases mentioned in the preceding propositions by months in the years 1892-1902, is stated in Tables 13 and 17, on subsequent pages of this article.

For the preparation of Tables 15 and 16 in this article, tables similar to Table 12 relating to bronchitis have been prepared for the other twenty-seven diseases which are considered in this article, and also for the average disease, but, on account of lack of space, are not printed.

*Relations of diarrhea and other "warm-weather" diseases to meteorological conditions.**

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, whooping-cough, inflammation of brain, or inflammation of bowels, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea (or of the other diseases named), these conditions were **less** than the average for the year.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, whooping-cough, inflammation of brain, or inflammation of bowels, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and that in months when **less** than the average per cent of reports stated the presence of diarrhea (or of the other diseases named), these conditions were **greater** than the average for the year.

Explanations of propositions 1 and 2 are given on a preceding page, under the heading "Climate and Sickness."

A summary relative to the foregoing propositions, is presented in Table 16, near the close of this article.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to proposition 1, it is true, also, that the quantity of vapor inhaled daily was **greater** than the average, and the quantity exhaled daily in excess of that inhaled was **less** than the average in months when **more** than the average per cent of reports stated presence of diarrhea, or of the other diseases named in propositions 1 and 2; and that **less** vapor was inhaled and a **greater** excess exhaled daily in months when the per cent of reports stating presence of diarrhea, or of the other diseases named in propositions 1 and 2 was **less** than the average.

On what per cent of the weekly reports received, by months in the years 1892-1902, the twelve foregoing diseases were reported present, is stated in Table 14, on a subsequent page of this article.

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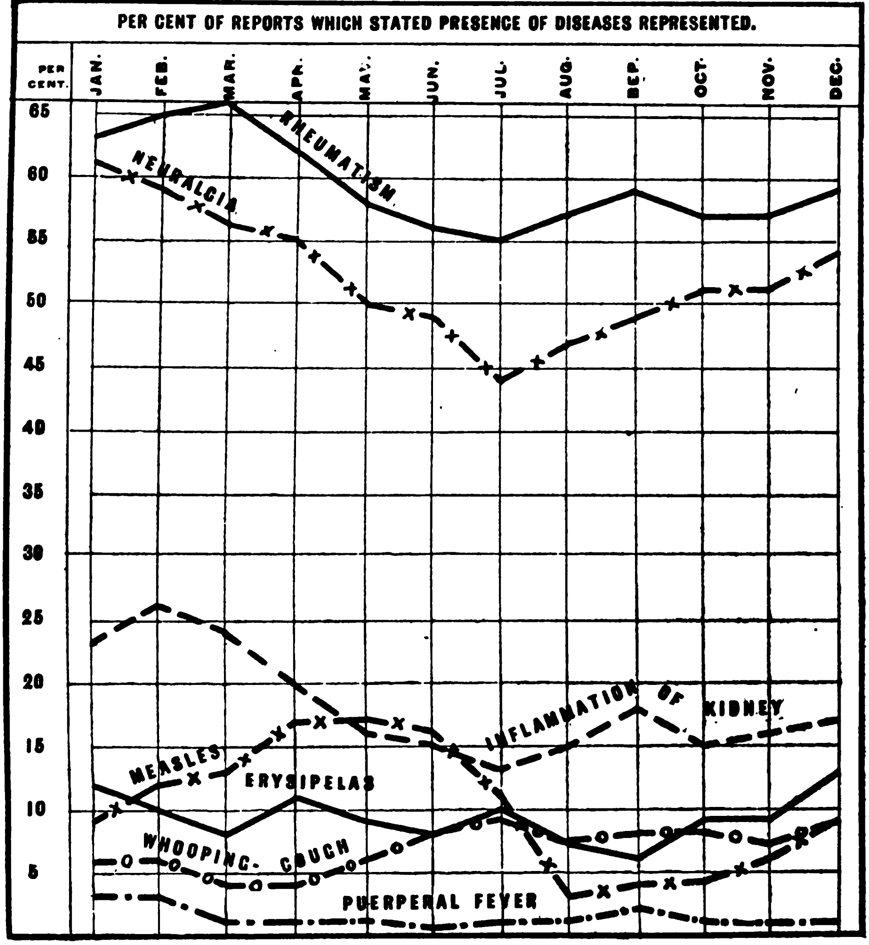
*A comparison of meteorological conditions in 1902, with the average for series of years, is given on a preceding page of this article.

The lines for 1902, relative to the twelve diseases, are graphically represented in Diagrams 1, 3, 4 and 5 in this article.

DIAGRAM 3—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1902.



[PLATE 1156]

TABLE 14.—*By year and months for 1902 and for the preceding year, and averages for the 10 years, 1892-1901, stating on what per cent of the weekly reports received* DIARRHEA, CHOLERA INFANTUM, INTERMITTENT FEVER, REMITTENT FEVER, TYPHOID FEVER, TYPHO-MALARIAL FEVER, MEASLES, WHOOPING-COUGH, CHOLERA MORBUS, DYSENTERY, INFLAMMATION OF BRAIN AND INFLAMMATION OF BOWELS, *were reported present, and comparing the per cents for 1902 with the averages for corresponding months in the years specified. (The per cent of increase or decrease of any disease in 1902, when compared with the average for the preceding 10 years, may be found by multiplying the difference by 100, and dividing the product by the figure representing the average.)*

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Diarrhea.	Av. 10 years, 1892-1901	38	22	21	23	25	26	35	54	69	70	50	28	24	Cholera infantum.	10	1	1	1	2	3	7	19	31	30	12	2	1
	1901	36	18	14	21	24	30	35	57	67	66	46	26	23		7	.9	.6	.4	.3	1	4	17	28	27	9	.4	.4
	1902	33	24	22	23	22	23	30	48	57	57	37	27	25		5	.2	.9	.2	.9	1	2	12	21	17	5	.7	.4
	In 1902 greater than av. 1892-1901	...	2	1	=	...	..	..	..	...	..	..	..	1		..	..	..	..	...	..	..	..	..	..	..	..	..
	In 1902 less than av. 1892-1901	5	...	...	=	3	3	5	6	12	13	13	1	..		5	.8	.1	.8	1.1	2	5	7	10	13	7	1.3	.6
Intermittent fever.	Av. 10 years, 1892-1901	20	15	13	15	20	21	21	23	25	25	24	20	15	Remittent fever.	15	12	11	10	12	13	13	17	19	21	20	16	14
	1901	14	12	7	12	14	15	15	16	17	19	16	14	10		9	7	5	6	7	9	8	8	14	16	12	9	6
	1902	13	9	11	10	13	14	14	15	15	15	16	13	10		7	5	6	5	8	8	9	6	10	8	8	6	5
	In 1902 greater than av. 1892-1901	...	...	...	...	...	..	..	..	...	..	..	..	..		..	..	..	..	...	..	..	..	..	..	..	...	..
	In 1902 less than av. 1892-1901	7	6	2	5	7	7	7	8	10	10	8	7	5		8	7	5	5	4	5	4	11	9	13	12	10	9
Typhoid fever.	Av. 10 years, 1892-1901	10	8	6	5	4	4	5	8	14	19	22	17	11	Typho-mal. fever.	3	2	1	1	1	1	1	3	4	5	5	4	3
	1901	13	20	10	9	10	5	4	7	19	23	23	14	11		1	2	2	.7	.3	1	.2	1	.6	1	2	2	2
	1902	12	10	6	7	6	9	9	10	15	21	19	14	14		2	2	1	.9	0	.4	1	2	2	3	2	4	1
	In 1902 greater than av. 1892-1901	2	2	=	2	2	5	4	2	1	2	..	..	3		..	=	=	..	...	..	=	..	..	..	..	=	..
	In 1902 less than av. 1892-1901	...	...	=	...	...	..	..	..	...	..	3	3	..		1	=	=	.1	1	.6	=	1	2	2	3	=	2
Measles.	Av. 10 years, 1892-1901	7	6	8	11	14	15	14	8	4	2	2	3	4	Whooping-cough	7	7	6	6	7	7	8	9	8	7	5	6	7
	1901	5	3	3	5	8	7	10	7	3	3	4	5	5		5	2	4	5	5	6	6	3	1	4	5	8	7
	1902	10	9	12	13	17	17	16	11	3	4	4	6	9		7	6	6	4	4	6	8	9	7	8	8	7	9
	In 1902 greater than av. 1892-1901	3	3	4	2	3	2	2	3	...	2	2	3	5		=	..	=	..	...	..	=	=	..	1	3	1	2
	In 1902 less than av. 1892-1901	...	...	...	...	...	..	..	..	1	..	..	..	..		=	1	=	2	3	1	=	=	1	..	..	...	..
Cholera morbus.	Av. 10 years, 1892-1901	13	3	3	3	4	5	12	26	36	33	14	5	3	Dysentery.	13	5	4	5	4	5	8	18	33	35	21	7	4
	1901	10	2	3	2	2	5	7	21	29	29	11	4	2		9	4	3	3	4	4	5	15	26	25	13	6	3
	1902	8	2	3	2	.9	3	8	18	27	17	7	4	3		7	4	4	4	3	3	4	9	18	16	8	2	3
	In 1902 greater than av. 1892-1901	...	...	=	...	...	..	..	..	...	..	..	..	=		..	..	=	..	...	..	..	..	..	..	..	...	..
	In 1902 less than av. 1892-1901	5	1	=	1	3.1	2	4	8	9	6	7	1	=		6	1	=	1	1	2	4	9	15	19	13	5	1
Inflam. of brain.	Av. 10 years, 1892-1901	2	2	3	2	3	2	3	2	2	2	2	2	2	Inflam. of bowels.	11	9	8	10	10	10	12	13	16	14	12	8	9
	1901	.9	2	1	1	0	.4	2	.4	1	.7	,2	.9	1		9	9	8	7	5	7	10	10	14	16	12	7	8
	1902	1	2	.9	.7	.4	2	1	1	.8	1	2	2	1		9	10	12	12	7	9	8	8	11	12	8	8	10
	In 1902 greater than av. 1892-1901	...	=	...	...	...	=	..	..	...	..	=	=	..		..	1	4	2	...	..	..	..	..	..	..	=	1
	In 1902 less than av. 1892-1901	1	=	2.1	1.3	2.6	=	2	1	1.2	1	=	=	1		2	..	..	..	3	1	4	5	5	2	4	=	..

COLD-WEATHER DISEASES.

TABLE 15.—*Summary relative to propositions on preceding pages concerning relations by months, in 1902, between greater or less than usual prevalence of diseases named and certain given coincident climatic conditions.*

Diseases.	Months (inclusive) in which diseases named were more than usually prevalent in 1902.	Months (inclusive) in which diseases named were less than usually prevalent in 1902.	For the 12 months of the year 1902. Number of months in which propositions hold true.*										
			That in months when diseases named were more than usually prevalent the conditions named below were greater than usual, and in months when less than usually prevalent these conditions were less than usual.							That in mos. when diseases named were more than usually prevalent the conditions named below were lower than usual, and in months when the diseases were less than usually prevalent these conditions were higher than usual.			
			Relative humidity.	Av. per cent of cloudiness.	Ozone.		Velocity of wind.	Atmospheric pressure. Range.		Average temperature.	Av. daily range of temp.	Average daily atmospheric pressure.	Absolute humidity.
					Day.	Night.		Monthly.	Av. daily.				
Bronchitis..........	Jan.-Apr., Nov., Dec.	May-Oct.........	8	7	7	8	11	10	11	12	11	6	11
Pneumonia.........	Jan.-Apr., Nov., Dec.	May-Oct.........	8	7	7	8	11	10	11	12	11	6	11
Membran. croup...	Feb., March, June, Dec.	Jan., Apr., May, July-Nov.	7	7	7	10	7	8	7	8	9	8	7
Diphtheria..........	Oct.-Dec.........	Jan.-Sept.......	7	8	2	5	9	7	8	7	8	3	7
Tonsillitis..........	Jan.-Apr., Nov., Dec.	May-Oct.........	8	7	7	8	11	10	11	12	11	6	11
Influenza...........	Jan.-Apr., Dec.	May-Nov........	7	6	8	9	10	11	10	11	10	7	10
Scarlet fever......	Jan.-Mar., Dec.	Apr.-Nov........	8	7	7	8	9	10	9	10	11	6	9
Rheumatism.......	Jan.-Apr.........	May-Dec........	6	5	9	8	9	10	9	10	9	8	9
Neuralgia..........	Jan.-Apr., Dec.	May-Nov........	7	6	8	9	10	11	10	11	10	7	10
Consumption, pul..	Jan., Oct., Nov.	Feb.-Sept., Dec.	7	8	4	3	9	7	8	7	8	3	8
Pleuritis...........	Jan.-Apr., Dec.	May-Nov.......	7	6	8	9	10	11	10	11	10	7	10
Inflam. of kidney..	Jan.-Apr.........	May-Dec........	6	5	9	8	9	10	9	10	9	8	9
Meningitis..........	Feb., Apr., May	Jan., Mar., June, Dec.	5	4	8	9	6	7	6	7	6	7	6
Puerperal fever...	Jan., Feb., Sept., Oct.	March-Aug., Nov., Dec.	8	7	5	4	7	8	7	6	7	6	7
Erysipelas..........	Jan., Feb., Apr., July, Dec.	Mar., May, June, Aug.-Nov.	9	6	6	7	8	9	8	9	8	7	8
Smallpox...........	Jan.-May........	June-Dec........	5	4	10	9	8	9	8	9	8	7	8
Average disease...	Jan.-Mar., Dec.	Apr.-Nov........	8	7	7	8	9	10	9	10	11	6	9

***The figures in each of these eleven columns show for how many months out of the twelve months in 1902, the proposition named over the column holds true: thus, concerning bronchitis, the proposition relative to average daily range of temperature held true in eleven months out of the twelve; that relative to average temperature, in each of the twelve, etc.**

WARM-WEATHER DISEASES.

TABLE 16.—***Summary relative to propositions on preceding pages concerning relations by months, in 1902, between greater or less than usual prevalence of diseases named, and certain given coincident climatic conditions.***

Diseases.	Months (inclusive) in which diseases named were more than usually prevalent in 1902.	Months (inclusive) in which diseases named were less than usually prevalent in 1902.	For the 12 months of the year 1902. Number of months in which propositions hold true.*										
			That in months when diseases named were more prevalent than usual, the conditions named below were higher than usual; and in months when the diseases were less prevalent than usual, these conditions were lower than usual.				That in months when diseases named were more prevalent than usual, the conditions named below were less than usual; and in months when the diseases were less prevalent than usual, these conditions were greater than usual.						
							Atmospheric pressure.				Ozone.		
							Range.						
			Average temperature.	Average daily range of temperature.	Absolute humidity.	Average daily atmospheric pressure.	Monthly.	Av. daily.	Relative humidity.	Average per cent of cloudiness.	Day.	Night.	Velocity of wind.
Diarrhea	July-Oct.	Jan.-June, Nov., Dec.	10	9	9	5	8	9	7	6	9	10	10
Cholera infantum	July-Sept.	Jan.-June, Oct., Dec.	9	8	10	5	9	10	6	7	8	9	10
Intermittent fever	May-Oct.	Jan.-Apr., Nov., Dec.	12	11	11	6	10	11	8	7	7	8	11
Remittent fever	Apr.-June, Aug.-Oct.	Jan.-Mar., July, Nov., Dec.	10	11	9	6	8	9	10	8	5	6	9
Typhoid fev. (ent.)	Aug.-Dec.	Jan.-July	7	6	6	9	7	6	6	4	10	9	6
Typho-mal. fever	July-Nov.	Jan.-June, Dec.	9	8	8	7	9	8	6	6	10	11	8
Measles	Feb.-July	Jan.-Aug., Dec.	6	7	7	2	6	7	8	9	3	2	8
Whooping-cough	June, July, Sept.-Dec.	Jan. May, Aug.	8	7	7	6	8	7	4	3	11	8	7
Cholera morbus	July-Sept.	Jan.-June, Oct.-Dec.	9	8	10	5	9	10	6	7	8	9	10
Dysentery	July-Oct.	Jan.-June, Nov., Dec.	10	9	9	6	8	9	7	7	9	10	9
Inflam. of brain	Jan., May-July, Oct., Nov.	Feb.-Apr., Aug., Sept., Dec.	8	7	7	8	8	7	6	5	7	8	7
Inflam. of bowels	Jan.-Mar., Aug., Sept., Dec.	Apr.-July, Oct., Nov.	4	3	5	6	4	5	5	5	5	6	6

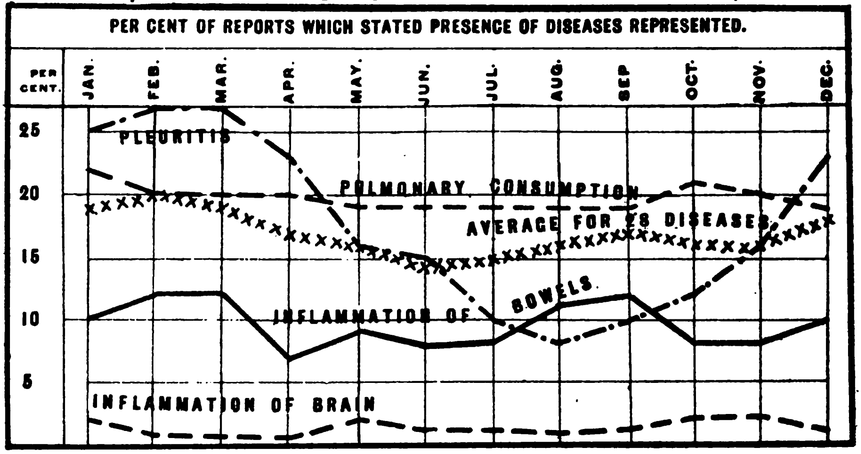
*The figures in each of these eleven columns show for how many months out of the twelve months in 1902 the proposition named over the column holds true: thus, concerning diarrhea, the proposition relative to average daily range of temperature held true in nine months out of the twelve; that relative to absolute humidity, nine months out of the twelve, etc.

Total sickness—average disease.—"Average disease" is an average of the tabulated diseases reported present on all the cards received and compiled at this office during the year. It is probably equivalent to the actual sickness from all diseases printed on the report cards, and probably represents very nearly the average sickness from all the diseases in the State. A sample of the report cards on which diseases are reported to this office is shown on the third page of this article. Twenty-eight diseases are printed on the cards. In 1902 there were 5,979 of these card reports received. On some of the cards only one or two diseases were reported present and on others more. Had each disease (printed on this card, and only the twenty-eight thus named) been reported present on every card received at this office, there would have been 167,412 reports of diseases present. (This is the product of 5,979 reports received multiplied by twenty-eight, the number of diseases printed on the cards, or 100 per cent of the possible disease reports.) There were actually present on the cards received at this office only 28,087 disease reports, which 28,087÷167,412 of the possible disease reports that might have been present, is about 17 per cent. This 17 per cent represents the actual sickness in the State from the tabulated diseases reported present, or in other words the sickness from "average disease." This is shown, by months, in Diagram 4, on this page.

Table 17 serves to indicate the probable actual sickness in the State from the tabulated diseases in the years 1892-1902. It compares the sickness, by months, in 1902 with the sickness in each of the ten years, 1892-1901, and indicates that the sickness reported in 1902 was, for the year, and, with the exception of February and December, for each month of the year, less than the average.

On this subject Tables 7 and 8, on preceding pages, and the accompanying remarks, may be studied in connection with the tables and remarks in this part of this article. In Table 7, the order of prevalence of each disease, including the "average disease," is shown as it appears after taking account of the order or prevalence of each disease in the places where it was present, and also the per cent of all reports received on which that disease was reported.

DIAGRAM 4—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1902.



[PLATE 1189.]

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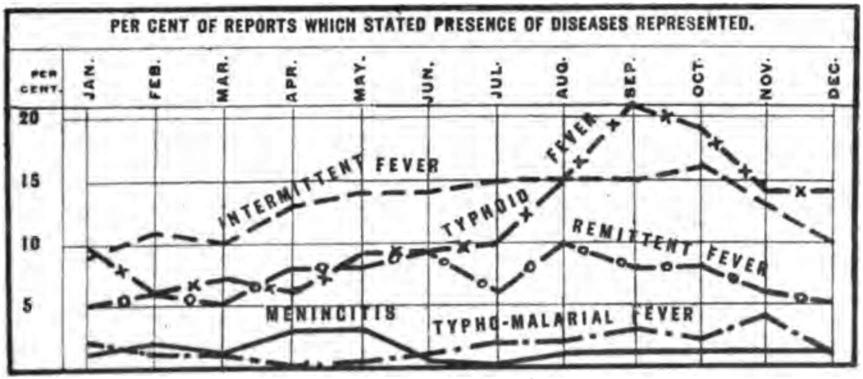
TABLE 17.—SICKNESS FROM AVERAGE DISEASE, 1892-1902.—*By year and months for each of the years, 1892-1902, stating on an average for such of the 28 diseases tabulated as were reported present, what per cent of the weekly reports received stated presence of the diseases; and comparing the average per cents for months in 1902 with the averages for corresponding months in the 10 years, 1892-1901.*

Years, etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 10 years, 1892-1901	19	20	19	20	20	18	17	17	19	19	19	18	18
1892	21	26	25	24	24	20	19	19	22	23	22	20	23
1893	20	21	21	20	20	19	18	18	21	21	20	20	20
1894	20	20	19	20	20	19	18	18	20	22	20	19	19
1895	20	20	21	22	22	19	18	19	20	19	19	17	18
1896	18	19	19	20	17	16	16	17	18	18	17	17	17
1897	18	18	18	19	18	17	16	17	18	19	19	17	16
1898	17	17	18	17	18	15	14	15	18	18	18	17	18
1899	17	18	19	18	18	16	15	17	17	19	17	17	17
1900	18	18	19	19	19	18	16	17	19	21	19	18	18
1901	18	19	19	20	19	17	16	15	17	10	17	17	18
1902	17	19	20	19	17	16	14	15	16	17	16	16	18
In 1902, greater than average, 1892-1901	....	....	1	....	....	....	...	....	....	....	....	....	=
In 1902, less than average, 1892-1901	2	1	....	1	3	2	3	2	3	2	3	2	=

DIAGRAM 5—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1902.



[PLATE 1190.]

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1902.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper continues a subject treated for the preceding year on pages 105-239 of the Report of the State Board of Health for the year 1902, and for former years in previous reports.

Whenever information is received at this office that consumption, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, German measles (rötheln), rabies or glanders, is present, or has recently been present in any locality in Michigan, a letter is sent to the health officer of the township, city or village in which the disease is reported to be present (if the name of the health officer has been reported to this office; if not, to the president of the board of health), mentioning the reported existence of the disease within his jurisdiction, indicating his duties and powers and the proper measures to be taken in restricting the disease, transmitting documents of instruction relative to the prevention and restriction of the disease, for distribution among the neighbors of families in which the disease is present,* and asking for a report of the methods employed for the restriction of the disease, and the results of efforts for suppressing it, also the number of cases and deaths in each outbreak. With this letter in each instance, except in case of rabies and glanders, there was sent a blank form (L), or (S for consumption), for the notice of the first case of a dangerous communicable disease, and a blank form (M) for weekly reports during the continuance of the disease. After the outbreak was over, there was sent a blank form (K), (O), (Q), (R) or (U) for a special final report, for the purpose of learning what was done for the restriction and prevention of the disease, by way of isolation and disinfection; also whether or not disinfection was by fumes of burning sulphur or by formaldehyde, and whether either is efficient as a disinfectant, and what quantity of each is required to accomplish disinfection. The blank (K) is for diphtheria, scarlet fever, measles, whooping-cough and rötheln; the blank (O) is for typhoid fever; the blank (Q) for smallpox; the blank (R) for consumption and the blank (U) for meningitis. These blanks for special final reports have been especially prepared, and differ from each other, therefore should be used only for the disease for which each is prepared.

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* It is believed that these documents distributed in this manner are doing great good; for the neighbors of the sick are sufficiently alarmed to read the documents, and are thus led to coöperate in stamping out the disease. Some evidence of the value of this work may be seen further on, in the several articles to which this is an introduction, in tables which show the estimated number of outbreaks of, and cases of sickness from communicable diseases prevented, and lives saved by isolation and disinfection.

In the report of this Board for the year 1895 (pp. 153-174) in the introduction to the articles on the dangerous communicable diseases, are printed tables and diagrams which show the results of restrictive measures recommended by this Board.

TABLE 1.—*Number of all places* in Michigan at which communicable diseases were reported present, also the number of new places† at which each disease was reported present each week in 1902*

Weeks ending Saturday—		Consumption.		Diphtheria.		Typhoid fever.		Scarlet fever.		Measles.		Whooping-cough.		Meningitis.		Smallpox.	
		All places.	New places.	All places.	New places.	All places.	New places.	All places.	New places.	All places.	New places.	All places.	New places.	All places.	New places.	All places.	New places.
January	4..	200	9	28	5	43	8	113	29	24	13	19	5	6	4	113	23
	11..	214	11	29	14	51	16	134	38	31	7	25	6	5	2	120	22
	18..	214	10	26	10	45	8	119	32	45	10	20	5	5	1	133	26
	25..	216	9	33	9	46	9	125	27	47	17	19	2	4	1	138	26
February	1..	215	3	27	7	48	11	117	27	60	19	27	8	4	0	139	16
	8..	211	3	25	12	52	14	111	20	63	22	22	5	4	2	149	22
	15..	211	5	27	2	51	10	124	24	67	8	21	3	9	3	157	38
	22..	209	5	32	8	52	11	125	18	64	13	21	2	6	3	153	23
March	1..	210	5	37	12	48	12	126	29	64	14	26	4	7	2	143	23
	8..	208	5	31	9	50	12	115	30	73	12	16	3	4	1	140	22
	15..	207	8	27	3	45	13	109	24	71	21	17	2	5	0	145	20
	22..	211	8	25	8	46	10	102	17	76	19	18	3	5	2	158	31
	29..	216	6	26	8	42	14	90	20	64	21	20	4	4	7	165	27
April	5..	220	5	24	5	35	8	87	16	62	11	14	3	6	3	157	20
	12..	215	9	21	5	32	7	84	19	80	18	15	2	6	4	133	18
	19..	214	0	17	3	32	2	85	24	91	23	17	5	7	1	126	20
	26..	219	3	15	2	40	7	91	20	77	20	17	5	8	3	110	15
May	3..	226	8	23	5	32	12	83	23	76	12	15	4	5	3	121	19
	10..	228	8	30	12	38	14	87	19	82	34	15	4	9	1	100	19
	17..	227	6	21	8	35	7	83	14	76	19	17	2	7	3	93	12
	24..	223	1	22	6	38	10	74	19	61	13	17	7	9	1	87	18
	31..	223	11	25	10	33	8	71	16	55	11	17	3	8	3	93	14
June	7..	227	4	20	7	39	9	63	20	68	15	22	8	5	2	78	16
	14..	222	9	20	5	40	11	61	10	64	18	20	10	4	0	72	8
	21..	227	6	26	6	36	8	55	14	53	11	18	6	7	2	79	16
	28..	227	10	30	11	41	11	61	19	64	22	25	7	4	3	71	16
July	5..	235	5	24	7	41	8	48	12	58	8	25	4	5	0	78	10
	12..	231	7	18	3	42	14	56	21	54	16	30	10	6	0	59	9
	19..	230	6	20	5	38	5	46	13	68	12	33	10	7	3	47	15
	26..	218	14	22	6	39	8	42	8	59	17	26	3	7	3	46	6
August	2..	213	8	20	7	47	14	45	7	47	10	25	2	4	1	41	7
	9..	212	10	14	5	56	19	47	12	36	9	23	5	5	1	35	7
	16..	222	8	13	5	76	34	52	9	24	3	22	6	7	4	38	6
	23..	219	13	16	5	86	31	48	15	23	4	18	1	7	2	36	3
	30..	222	4	24	7	92	33	53	17	23	5	23	5	8	2	25	4
September	6..	223	8	25	7	84	19	43	9	20	6	18	5	2	2	26	6
	13..	222	3	23	14	75	16	38	9	23	3	13	3	4	0	26	4
	20..	222	4	21	7	88	27	60	13	22	3	18	4	4	0	24	4
	27..	219	8	23	8	96	31	66	25	20	6	21	8	4	0	16	4
October	4..	221	7	29	10	100	24	72	21	19	9	16	1	2	2	16	7
	11..	222	6	34	13	88	24	72	23	21	3	18	3	3	1	20	3
	18..	223	4	32	7	80	13	72	14	18	2	13	4	3	1	15	4
	25..	328	8	38	9	91	18	73	15	16	7	17	1	3	1	18	3
November	1..	226	4	43	9	91	19	63	18	18	4	20	5	3	0	19	6
	8..	225	2	40	9	81	19	77	15	21	4	20	6	4	0	20	6
	15..	232	5	44	7	79	14	81	28	30	6	19	2	3	3	25	8
	22..	236	6	46	21	74	14	75	22	31	6	19	2	4	2	28	8
	29..	230	6	38	6	68	10	71	10	25	7	17	2	4	0	29	4
December	6..	215	9	42	11	62	10	79	17	27	5	19	1	6	2	43	12
	13..	225	7	57	14	59	11	82	23	30	7	26	4	5	1	40	12
	20..	228	11	54	14	56	11	87	31	28	9	25	6	3	1	65	16
	27..	227	1	43	14	45	12	84	19	23	2	17	4	4	2	70	23
Average number of places for week..		221	7	28	8	56	14	79	19	47	11	20	4	5	2	79	14

* The numbers of "All places" are copied from the weekly bulletins, **"Health in Michigan,"** issued every Wednesday, and include all places at which the several **diseases were reported** present up to and including Saturday of the calendar week for which **each bulletin is issued.** The "New places" are included in these numbers.

The remainder of foot-notes are on page 102.

The information contained in the reports upon the above-mentioned blanks and those supplied to health officers of townships, cities and villages, for their annual reports, when returned to this office by the health officers of localities where dangerous communicable diseases have existed, together with other correspondence in regard to outbreaks of such diseases, are the bases on which the various statements made in this article are founded.

It is probable that in previous years, up to the year 1900, every case of smallpox was reported to the Secretary of the State Board of Health; but that cannot yet be said of any other of the diseases in Table 1, and during the present epidemic of a mild form of smallpox, probably it cannot be truthfully said of smallpox. Named in the order of most complete reports, probably these communicable diseases would be arranged as follows: Smallpox, scarlet fever, diphtheria, typhoid fever, measles, whooping-cough, meningitis, consumption.

Some of the purposes of this compilation.—The object in having the data contained in the various reports received at the office of the secretary compiled, tabulated and published are: First, that facts relative to the ways whereby dangerous communicable diseases are spread in Michigan, and how they are sometimes restricted, and other useful facts, may be submitted to the people of the State, knowledge of which, it is hoped, will enable them to avoid or combat such diseases; and second, by the collation of such data to aid in the progress of sanitary science, especially in so far as it bears on the study of the causes and best measures for the prevention of dangerous communicable diseases in Michigan.

Persistent efforts of this Board have been directed toward impressing the people of the State with the necessity of adopting restrictive measures,—isolation and disinfection, in outbreaks of communicable diseases.

Definition of the term "outbreak" as used in following articles.—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction), died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty-day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area.

The numbers in the first column, "Places," are compiled from the data in card-reports for the sickness statistics, the outbreak reports of communicable diseases, and the weekly reports of communicable diseases.

† The "New places," are those from which the specified diseases were first reported during the calendar week specified in each bulletin. They are compiled from the same sources as are the numbers in the first column of this table and from newspaper reports. Neither of the columns of this table contains *all* the places at which, later, by the "final" and "annual" reports, the diseases were found to have been present; but the compilation of a table which should contain all such places would be impracticable; and this table is sufficiently complete to give a good practical knowledge of the subject.

ABSTRACTS FROM THE QUARTERLY REPORTS OF WORK IN THE OFFICE OF THE SECRETARY, DURING THE YEAR 1902.

Summary relative to the year 1902.—The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office, during the year 1902, are as follows: For consumption, 1,383; for diphtheria (including croup) 512; for typhoid and typho-malarial fever 872; for scarlet fever 1,037; for measles 616; for whooping-cough 329; for meningitis 443, and for smallpox 734. Total for the eight diseases 5 926.

The number of communications relative to dangerous communicable diseases, received and placed on file during the year, was 27,508.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards or in the form of the circular letter, were sent out during the year, to the number of 23,800.

TABLE 2.—YEAR 1902.—*Exhibiting the number of outbreaks of consumption, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis and smallpox, from January 1 to December 31, 1902, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, first information concerning which was received through the newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, January 1 to December 31, 1902.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Consumption	*1,383	5	60	8	32
Diphtheria (includes croup)	*512	2	20	40	40
Typhoid fever (includes typho-malarial)	*872	12	38	26	36
Scarlet fever	*1,037	3	41	22	37
Measles	*616	6	44	6	50
Whooping-cough	*329	6	58	10	32
Meningitis	*443	2	13	50	37
Smallpox	*734	4	37	33	30
Averages for the eight diseases		5	44	20	36

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* The numbers of outbreaks given in this table do not necessarily agree with the numbers given in tables in special articles in this annual report, for the reason that all alleged outbreaks, of which information was obtained from the newspapers and other sources are included in this table. If the health officers denied that such outbreaks occurred, or if they make no response to the letters sent from this office, relative to newspaper reports, such alleged outbreaks are not included in the final compilation of that disease.

The final reports of outbreaks received and filed during the year 1902, were: For consumption, 1,685; for diphtheria, 433; for typhoid and typho-malarial fever 748; for scarlet fever 1,022; for measles 522; for whooping-cough 203; for meningitis 339, and for smallpox 739. Total for the eight diseases 5,691.

The registration and return of deaths in Michigan, to the State Department, has resulted in giving this office, during the year 1902, the first information of the occurrence of 1,042 deaths from consumption; 85 deaths from diphtheria and croup; 156 deaths from typhoid and typho-malarial fever; 44 deaths from scarlet fever; 34 deaths from measles; 107 deaths from whooping-cough, and 351 deaths from meningitis. A total for the seven diseases of 1,819.

During the year 1902, the local columns of 11,580 newspapers have been looked over for the reports of the occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office first information of the alleged occurrence of 63 cases of consumption; 10 outbreaks of diphtheria; 107 outbreaks of typhoid and typho-malarial fever; 27 outbreaks of scarlet fever; 34 outbreaks of measles; 19 outbreaks of whooping-cough; 8 cases of meningitis and 27 outbreaks of smallpox. A total for the 8 diseases of 295. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table (2) on the preceding page.

For the purpose of facilitating the proper action for the restriction of "diseases dangerous to the public health" and to make it possible to compile the important "contagious disease statistics," a record is kept of facts concerning every outbreak of a "disease dangerous to the public health," upon which action is taken by this office, and also of every important communication relating thereto received or sent out. This required over 51,000 entries to be made in the "Record Books," one of which books is kept for each dangerous communicable disease. An increase of 3,000 entries over the preceding year.

During the year 1902, compared with the year 1901, action was taken on outbreaks of dangerous communicable diseases as follows: On consumption 229 cases less; on diphtheria 100 outbreaks less; on typhoid and typho-malarial fever 147 outbreaks less; on scarlet fever 2 outbreaks more; on measles 286 outbreaks more; on whooping-cough 106 outbreaks more; on meningitis 3 cases more, and on smallpox 151 outbreaks more, than in 1901. Including all diseases, action was taken in 102 instances more in 1902 than in 1901.

CONSUMPTION IN MICHIGAN—YEAR ENDING DECEMBER 31, 1902.

During the year ending December 31, 1902, there were reported to the Secretary of the State Board of Health 2,658 cases, including 2,185 deaths from consumption in Michigan.[*] These reports were received from 873 localities in the State. These numbers are probably less than the actual number of consumption-infected localities in Michigan, and very much less than the actual number of cases. Many cases are of long duration, and in the early stages, and sometimes in the latest stages, are not under the care of a physician; as a consequence many of these cases are not reported. From many localities the deaths only from consumption are reported; therefore the apparent ratio of deaths to cases is much too high.

CONSUMPTION IN 1902, COMPARED WITH PREVIOUS YEARS.

According to the reports made to the Secretary of the State Board of Health.—The compilation of information relative to the prevalence of consumption in Michigan, as thus reported, was made for the first time for the year 1893. Table 1 shows the reported number of cases and deaths from consumption, the number of localities where the disease was reported present, the average numbers of cases and deaths per locality, and the deaths per 100 cases, for each of the years 1893-1902.

TABLE 1.—CONSUMPTION IN MICHIGAN.—*Numbers of reported cases and deaths, number of localities in which they occurred, average number of cases and deaths per locality, and the per cent of cases reported which proved fatal, for each of the 10 years, 1893-1902.*

Year.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases reported.[†]
1893	525	1,988	3.8	1,509	2.9	75.9
1894	590	2,060	3.5	1,581	2.7	76.7
1895	626	2,068	3.3	1,613	2.6	78.0
1896	512	2,198	4.3	1,454	2.8	66.2
1897	664	1,715	2.6	1,396	2.1	81.4
1898[‡]	922	3,041	3.3	2,727	3.0	89.7
1899	920	2,975	3.2	2,516	2.7	84.6
1900	837	2,721	3.3	2,221	2.7	81.6
1901	891	2,915	3.3	2,344	2.6	80.4
1902	873	2,658	3.0	2,185	2.5	82.2

[*] On a subsequent page, the number of deaths from consumption reported to the Secretary of State is stated to be 2,030. That number includes only deaths from consumption of the lungs, while the number reported to this office (2,185) is not quite so restricted.

[†] From many localities the deaths only from consumption are reported; therefore the apparent ratio of deaths to cases is much too high to correctly represent the fatality of the disease; but as time goes on useful information may be gained by a study of the changes likely to occur in this column.

[‡] Beginning with 1898, the new law for the registration of deaths has resulted in increasing nearly every column in this table; because the deaths reported to the Secretary of State are taken account of under each heading.

The reports to the Secretary of the State Board of Health, while useful for many purposes, are probably now also useful for comparing the deaths in one year with the deaths in another very recent year.

According to the reports made to the Secretary of State.—Previous to the year 1898, not all deaths were reported to the Secretary of State, but probably the omissions were about the same in every year until the new law for the registration of deaths took effect, in the latter part of 1897; therefore the statistics of the State Department are useful for comparing one year with another, up to the close of the year 1897, also for comparing the several years since that year. But if the deaths since 1897 are to be compared with those previous to 1898 allowance should be made for the fact that a much greater proportion of the deaths which occurred have been reported under the new law than under the old law.

The following table (2) stating the number of deaths from consumption per 100,000 persons living, reported to the Secretary of State, for each of the thirty-four years, 1869-1902, probably quite accurately represents the annual fluctuations of, but not the total deaths from consumption in Michigan during the twenty-nine years, 1869-97. But for the five years 1898-1902 inclusive, the deaths were reported under a new law whereby it is believed that nearly all deaths were reported, whereas previous to that year some of the deaths were not reported.

TABLE 2.—*Exhibiting the number of reported deaths from pulmonary consumption per 100,000 persons living in Michigan in each of the 34 years, 1869-1902. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population for intercensal years estimated by average annual increase based on National and State censuses.)*

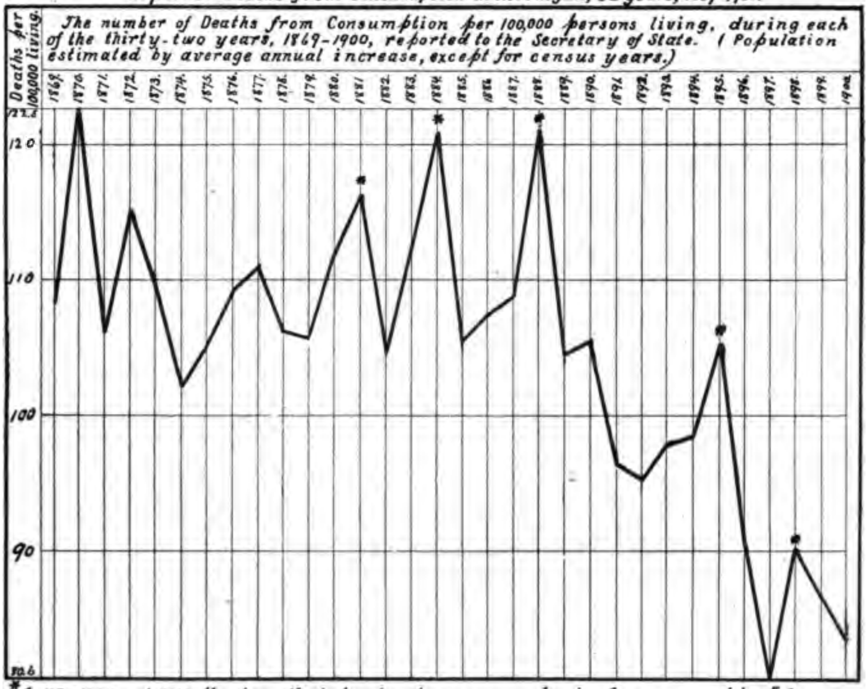
Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
Deaths....	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106 1	105.6	111.7	116.1	04.4	112.3	120.8	105.3
Year.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
Deaths....	107.3	108.7	121.0	104.3	105.4	96.3	95.2	97.7	98.4	105.1	90.4	80.6	91.5	86.5	83.4	85.1	82.4

Reports to the Secretary of State made under the new law, and the deaths therein reported, classified by the Bertillon system, show that in 1898 there occurred in Michigan 2,153 deaths from consumption—tuberculosis of the lungs—a death-rate from that disease of 91.5 per 100,000 of the total population; in 1899 there occurred in Michigan, from the same disease, 2,098 deaths, showing a death-rate of 86.5 per 100,000 of the total population; in 1900 there occurred in Michigan from the same disease 2,018 deaths, showing a death-rate of 83.4 per 100,000 inhabitants, a decrease of 3.1 per 100,000 in 1900, as compared with 1899; in 1901 there occurred in Michigan from the same disease 2,088 deaths, showing a death-rate of 85.1 per 100,000 inhabitants, an increase of 1.7 per 100,000 in 1901, as compared with 1900; and in 1902, there occurred in Michigan from the same disease 2,030 deaths, showing a death-rate of 82.4 per 100,000 inhabitants, a decrease of 2.7 per 100,000 in 1902, as compared with 1901.

By Table 2, and more readily by the diagram [Plate 1105], it may be seen that there was a remarkable and unprecedented decrease in the death-rate from consumption in Michigan in 1891, compared with any previous year; it was the first time that the disease had ever decreased so much, and the decrease occurred at a time when influenza was epidemic in this country, and the statistics for the Eastern States show an increase in the death-rate from consumption, which increase was attributed to the influence of the epidemic influenza.

The accompanying diagram [Plate 1105] graphically represents the figures contained in Table 2, to the year 1901.

Reported Deaths from Consumption in Michigan, 32 years, 1869-1900.



*In 1881, 1884 and 1888, the atmospheric temperature was very low in January, and in February it was slightly lower than the average February during the periods of years, 1864-80, 1864-83, and 1864-87, respectively. In 1895, it was low in January, and very low in February. In 1898, there was no such low temperature in the cold season of the year to which to attribute the apparently unusual mortality from consumption; probably the increase, compared with what might have been expected from the two preceding years, was due to the new law under which a much greater proportion of deaths which occurred were reported than had been in previous years.

[PLATE 1105]

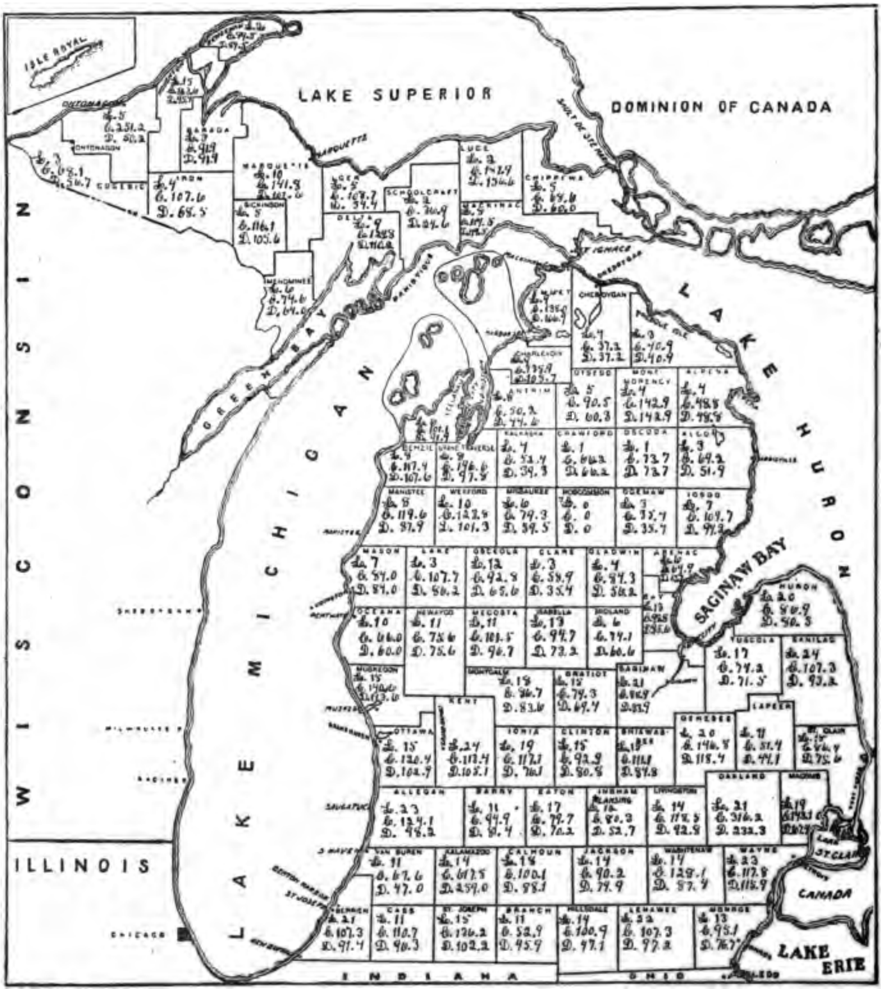
Relative to the last three years represented in the diagram, nearly all deaths which occurred were reported, while previous to that time the deaths reported should be increased by a very considerable per cent to make them equal the deaths which actually occurred; therefore the reduction in the death-rate from consumption in Michigan has undoubtedly been even greater than is apparent from a first glance at the diagram, Plate 1105.

The decrease in consumption in Michigan has apparently resulted from the education of the people generally to a knowledge that consumption is a dangerous communicable disease, which may easily be restricted. It is one more forcible illustration of the fact that "Knowledge is power."

Knowledge of the modes whereby consumption is usually spread, and of the ease with which its spread may be lessened, by the destruction or disinfection of all consumptive sputa, has apparently supplied a "power" which has caused an unprecedented reduction in the death-rate from consumption. The extent of the "campaign of education" which, in Michigan. began in 1880, and which took on an especially vigorous activity in 1891, can hardly be realized without a study of its history; but the apparent results of that educational movement are exceedingly plain to be seen from the diagrem—Plat No. 1105, printed on page 107.

DISTRIBUTION OF CONSUMPTION IN MICHIGAN IN 1902.

BY COUNTIES. THE REPORTED CASES AND DEATHS PER 100,000 INHABITANTS. INCLUDES ALL SUCH DEATHS REPORTED TO THE STATE DEPARTMENT.


ISLE ROYAL
LAKE SUPERIOR
DOMINION OF CANADA
SAULT DE STE MARIE
ONTONAGON L. 5 C. 251.2 D. 50.2
GOGEBIC L. 3 C. 68.1 D. 56.7
BARAGA L. 3 C. 91.9 D. 91.9
IRON L. 4 C. 107.6 D. 68.5
MARQUETTE L. 10 C. 141.8 D. 101.6
DICKINSON L. 5 C. 116.1 D. 105.6
MENOMINEE L. 6 C. 74.6 D. 64.0
ALGER L. 5 C. 107.7
DELTA L. 9 C. 128.8
SCHOOLCRAFT L. 2 C. 70.9 D. 24.6
LUCE L. 2 C. 142.9
MACKINAC L. 5
CHIPPEWA L. 5 C. 84.6 D. 60.0
MARQUETTE
ST IGNACE
CHEBOYGAN
GREEN BAY
EMMET L. 4 C. 135.9 D. 66.9
CHEBOYGAN L. 4 C. 37.2 D. 37.2
PRESQUE ISLE L. 3 C. 40.9 D. 40.9
CHARLEVOIX L. 4 D. 105.7
ANTRIM L. 6 C. 50.2 D. 44.6
OTSEGO L. 5 C. 90.5 D. 60.3
MONTMORENCY L. 4 C. 142.9 D. 142.9
ALPENA L. 4 C. 48.8 D. 48.8
BENZIE L. 4 C. 117.4 D. 107.6
GRAND TRAVERSE L. 9 C. 196.6 D. 97.5
KALKASKA L. 4 C. 52.4 D. 39.3
CRAWFORD L. 1 C. 66.2 D. 66.2
OSCODA L. 1 C. 73.7 D. 73.7
ALCONA L. 3 C. 69.2 D. 51.9
MANISTEE L. 8 C. 119.6 D. 87.9
WEXFORD L. 10 C. 122.8 D. 101.3
MISSAUKEE L. 6 C. 79.3 D. 59.5
ROSCOMMON L. 0 C. 0 D. 0
OGEMAW L. 3 C. 35.7 D. 35.7
IOSCO L. 7 C. 109.7 D. 94.3
MASON L. 7 C. 84.0 D. 84.0
LAKE L. 3 C. 107.7 D. 80.2
OSCEOLA L. 12 C. 92.8 D. 65.6
CLARE L. 3 C. 58.9 D. 35.4
GLADWIN L. 4 C. 87.3 D. 58.2
ARENAC L. 6
OCEANA L. 10 C. 66.0 D. 60.0
NEWAYGO L. 11 C. 75.6 D. 75.6
MECOSTA L. 11 C. 101.5 D. 96.7
ISABELLA L. 13 C. 94.7 D. 73.2
MIDLAND L. 6 C. 74.1 D. 60.6
BAY L. 13
HURON L. 20 C. 80.9 D. 50.3
MUSKEGON L. 15 C. 140.6 D. 113.6
MONTCALM L. 18 C. 96.7 D. 83.6
GRATIOT L. 15 C. 79.3 D. 69.4
SAGINAW L. 21
TUSCOLA L. 17 C. 74.2 D. 71.5
SANILAC L. 24 C. 107.3 D. 93.2
KENT L. 24 C. 113.4 D. 105.1
OTTAWA L. 15 C. 120.4 D. 102.9
IONIA L. 19 C. 117.1 D. 76.1
CLINTON L. 15 C. 92.9 D. 80.8
SHIAWASSEE D. 87.8
GENESEE L. 20 C. 146.8 D. 118.4
LAPEER L. 11 C. 51.4 D. 44.1
ST. CLAIR L. 15 C. 86.7 D. 75.6
ALLEGAN L. 23 C. 124.1 D. 98.2
BARRY L. 11 C. 94.9 D. 80.4
EATON L. 17 C. 79.7 D. 70.2
INGHAM LANSING L. 16 C. 80.3 D. 52.7
LIVINGSTON L. 14 C. 118.5 D. 92.8
OAKLAND L. 31 C. 316.2 D. 232.3
MACOMB L. 19
VAN BUREN L. 11 C. 67.6 D. 47.0
KALAMAZOO L. 14 C. 617.5 D. 259.0
CALHOUN L. 18 C. 100.1 D. 88.1
JACKSON L. 14 C. 90.2 D. 79.9
WASHTENAW L. 14 C. 128.1 D. 87.4
WAYNE L. 23 C. 117.8 D. 115.9
BERRIEN L. 21 C. 107.3 D. 91.4
CASS L. 11 C. 110.7 D. 90.3
ST. JOSEPH L. 15 C. 126.2 D. 102.2
BRANCH L. 11 C. 52.9 D. 45.9
HILLSDALE L. 14 C. 100.9 D. 97.1
LENAWEE L. 22 C. 107.3 D. 97.2
MONROE L. 13 C. 95.1 D. 76.7
LAKE MICHIGAN
LAKE HURON
SAGINAW BAY
WISCONSIN
ILLINOIS
INDIANA
OHIO
CHICAGO
MILWAUKEE
RACINE
SHEBOYGAN
MANISTEE
MUSKEGON
SAUGATUCK
S. HAVEN
ST JOSEPH
LAKE ST. CLAIR
CANADA
LAKE ERIE
TOLEDO

L.– Localities; C.– Cases per 100,000 population; D.– Deaths per 100,000 population.

[PLATE 1178]

TABLE 3.—*Numbers of cases and deaths reported from* **consumption** *and the numbers of reported cases and deaths per 100,000 persons living in each county in Michigan during the year 1902. (Compiled from reports of health officers, etc.)*

State and Counties.	Estimated population for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.	Deaths	Cases.	Deaths.
State	2,480,762	2,658	2,185	107.1	88.1
Alcona	5,781	4	3	69.2	51.9
Alger	7,358	8	4	108.7	54.4
Allegan	38,686	48	38	124.1	98.2
Alpena	18,432	9	9	48.8	48.8
Antrim	17,944	9	8	50.2	44.6
Arenac	10,779	7	6	64.9	55.7
Baraga	4,350	4	4	91.9	91.9
Barry	22,118	21	18	94.9	81.4
Bay	62,734	62	60	98.8	95.6
Benzie	10,221	12	11	117.4	107.6
Berrien	50,339	54	46	107.3	91.4
Branch	28,343	15	13	52.9	45.9
Calhoun	49,927	50	44	100.1	88.1
Cass	20,776	23	20	110.7	96.3
Charlevoix	14,718	20	16	135.9	108.7
Cheboygan	16,144	6	6	37.2	37.2
Chippewa	23,338	16	14	68.6	60.0
Clare	8,486	5	3	58.9	35.4
Clinton	24,760	23	19	92.9	80.8
Crawford	3,019	2	2	66.2	66.2
Delta	25,417	33	28	129.8	110.2
Dickinson	18,932	22	20	116.1	105.6
Eaton	31,352	25	22	79.7	70.2
Emmet	17,777	24	19	135.0	106.9
Genesee	42,220	62	50	146.8	118.4
Gladwin	7,116	6	4	84.3	56.2
Gogebic	17,622	12	10	68.1	56.7
Gd. Traverse	21,465	42	21	195.6	97.8
Gratiot	30,259	24	21	79.3	69.4
Hillsdale	29,729	30	14	100.9	47.1
Houghton	73,353	120	70	163.6	95.4
Huron	34,796	30	28	86.9	80.5
Ingham	39,860	32	21	80.3	52.7
Ionia	34,165	40	26	117.1	76.1
Iosco	9,548	10	9	104.7	94.3
Iron	10,220	11	7	107.6	68.5
Isabella	23,230	22	17	94.7	73.2
Jackson	48,782	44	39	90.2	79.9
Kalamazoo	45,060	93	39	206.4	86.6
Kalkaska	7,629	4	3	52.4	39.3
Kent	132,302	150	139	113.4	105.1
Keweenaw	3,352	3	3	89.5	89.5
Lake	4,643	5	4	107.7	86.2
Lapeer	27,229	14	12	51.4	44.1
Leelanau	10,882	11	10	101.1	91.9
Lenawee	48,360	52	47	107.3	97.2
Livingston	19,406	23	18	118.5	92.8
Luce	3,193	6	5	187.9	156.6
Mackinac	7,857	9	9	114.5	114.5
Macomb	33,528	48	36	143.1	107.4
Manistee	28,434	34	25	119.6	87.9
Marquette	42,313	60	43	141.8	101.6
Mason	19,037	16	16	84.0	84.0
Mecosta	20,681	21	20	101.5	96.7
Menominee	28,144	21	18	74.6	64.0
Midland	14,845	11	9	74.1	60.6
Missaukee	10,088	8	6	79.3	59.5
Monroe	32,612	31	25	95.1	76.7
Montcalm	32,286	28	27	86.7	83.6
Montmorency	3,498	5	5	142.9	142.9
Muskegon	36,980	52	42	140.6	113.6
Newaygo	17,189	13	13	75.6	75.6
Oakland	45,496	49	36	107.7	79.1
Oceana	16,658	11	10	66.0	60.0
Ogemaw	8,473	3	3	35.4	35.4
Ontonagon	5,971	15	3	251.2	50.2
Osceola	18,319	17	12	92.8	65.6
Oscoda	1,356	1	1	73.7	73.7
Otsego	6,633	6	4	90.5	60.3
Ottawa	39,859	48	41	120.4	102.9
Presque Isle	9,787	4	4	40.9	40.9
Roscommon	1,829	0	0	0	0
Saginaw	81,014	72	68	88.9	83.9
Sanilac	35,423	38	33	107.3	93.2
Schoolcraft	8,141	3	2	36.9	24.6
Shiawassee	34,202	38	29	111.1	84.8
St. Clair	55,528	48	42	86.4	75.6
St. Joseph	23,489	32	24	136.2	102.2
Tuscola	36,380	27	26	74.2	71.5
Van Buren	34,008	23	16	67.6	47.0
Washtenaw	49,177	63	43	128.1	87.4
Wayne	367,565	433	426	117.8	115.9
Wexford	17,775	22	18	123.8	101.3

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* Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

TABLE 4.—*Exhibiting by months, the number of deaths from consumption in Michigan for the year 1902, and the averages for the eight years 1894-1901, as reported to the State Board of Health; also exhibiting by months, the number of deaths from pulmonary consumption for the year 1902, and the averages for the eight years 1894-1901, as reported to the Secretary of State.*

Year.	Total number.	Number of deaths for each month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1902	2,185	191	164	212	217	215	195	169	168	183	151	143	177
Av. 8 years, 1894-1901	1,529	131	127	135	136	144	115	106	113	109	131	134	146
1902*	2,030	182	152	200	206	205	176	152	158	162	143	129	165
Av. 8 years, 1894-1901*	2,116	168	165	204	205	205	169	155	172	159	166	169	180

* The last two lines in Table 4 are the number of deaths from pulmonary consumption by months as reported to the Secretary of State.

Some of the reasons for believing that the decrease in the death-rate from consumption has been due to the popular education in the way the disease is usually spread, and in the way to restrict the disease, are: 1. The disease was under observation for many years before that knowledge became general, and (as shown by diagram, Plate 1105) it did not decrease; the decrease has been nearly coincident with the education, lagging behind somewhat at the outset, and gradually increasing later, as it would be expected to do if caused by the popular education. 2. Precisely similar decrease occurred in Michigan in the death-rate from scarlet fever and from other diseases, coincident with systematic popular education in the ways those diseases are usually spread, and in the best measures for their restriction. 3. The decrease in the mortality from consumption has, apparently, been greatest in those States where systematic popular education for its restriction has been most general and active. 4. There is no other known cause capable of producing such a gradually increasing effect as is shown to have occurred.

Sickness-rates from reported consumption in 1902.—Table 3 shows the reported sickness and sickness-rates from consumption by counties in the State. For reasons explained in the first paragraph of this article little reliance can be placed on the completeness of the reports of cases on which these particular sickness-rates are based. They are worked out in the hope that in the near future they may be made more valuable. For comparison of sickness from consumption by months, and for the year 1902 with preceding years, reference should be made to the article on "Time of greatest prevalence of each disease," on preceding pages of this volume.

Death-rates from reported consumption in 1902.—Table 3 shows that the death-rate from consumption reported for the whole State in 1902 was 88.1 deaths per 100,000 persons living in the State. This differs very much from the rate shown by the State Department. The explanation of this difference is that, whereas the statement by the Department of State includes only deaths from consumption of lungs (2,030), Table 3 includes all deaths from *consumption* reported to this office (2,658) irrespective of the part of the body in which the disease was located.

The county having the highest death-rate (156.6 deaths per 100,000 of population) was Luce. That having the lowest death-rate (24.6) was Schoolcraft.

The first two lines in Table 4 show that in 1902, as compared with the average for the eight years, 1894-1901, there was a large apparent increase in the number of deaths from consumption. This apparent increase may not be real, but due to a larger proportion of the actual deaths being reported since the new registration law became operative, as, in addition to the deaths reported directly to this office, others reported to the Secretary of State, of which we have not been notified by health officers, are received at this office from the Bureau of Vital Statistics in the State Department.

TABLE 5.—*Exhibiting, by sex, in certain age-groups, the number of cases and the number of deaths from consumption; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1902 which stated the ages.*

		Number and per cent of cases and deaths in certain age-groups.															
Ages in groups of years.	Sex.	All known ages.*	Under 10 years.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 to 64.	65 to 69	70 to 74.	75 years and over.
No. of cases..	Males...	1,121	36	13	66	160	166	127	123	112	81	58	55	36	36	30	22
	Females	1,291	30	30	161	232	219	132	138	86	61	52	34	38	33	23	22
Per cent the cases in each group were of all cases of known ages..	Males...	......	3.2	1.2	5.9	14.3	14.8	11.3	11.0	10.0	7.2	5.2	4.9	3.2	3.2	2.7	2.0
	Females	......	2.3	2.3	12.5	18.0	17.0	10.2	10.7	6.7	4.7	4.0	2.6	2.9	2.6	1.8	1.7
No. of deaths	Males...	1,022	34	11	56	150	152	118	109	96	73	53	51	33	35	29	22
	Females	1,163	30	25	142	219	204	112	114	79	53	49	31	35	29	20	21
Per cent the deaths in each group were of cases in that group....	Males...	91.2	94.4	84.6	84.8	93.7	91.6	92.9	88.6	85.7	90.1	91.2	92.7	91.7	94.4	96.7	100.0
	Females	90.1	100.0	83.3	88.2	94.4	93.2	84.9	82.6	91.9	86.9	94.2	91.2	92.1	87.9	87.0	95.5
Per cent the deaths in each group were of all deaths at known ages..	Males...	......	3.3	1.1	5.5	14.7	14.9	11.4	10.7	9.4	7.1	5.2	5.0	3.2	3.4	2.8	2.2
	Females	......	2.6	2.1	12.2	18.8	17.5	9.6	9.8	6.8	4.6	4.2	2.7	3.0	2.5	1.7	1.8
Per cent the deaths in special groups were of all deaths at known ages..	Males...	......	4.4		35.0			31.6			28.9						
	Females	......	4.7		48.6			26.2			20.5						

* Does not include those cases or deaths where the age was not stated.

The last two lines of Table 4 show the number of deaths from pulmonary consumption by months, as reported to the Secretary of State.

The maximum number of deaths from pulmonary consumption for 1894-1901 occurred in March, April and May; the minimum number in July.

The maximum number of deaths from all forms of consumption as reported to this office for the years 1894-1901, occurred in December, the minimum number in July.

TABLE 6.—AGE DISTRIBUTION OF DECEDENTS FROM CONSUMPTION: *Exhibiting, by sex, the persons who died of consumption, during the year 1902, and also during the years 1894-1901, the number, the average number, and per cent in each period of age. (Compiled from such reports to the State Board of Health, as stated sex and age.)*

Year.	1902.						1894-1901.								
	Number.			Per cent.			Number.			Per cent.			Av. number.		
Age at death, in periods of years.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10	34	30	64	3	3	3	167	218	385	3	3	3	21	27	48
10 to 20	67	167	234	7	14	11	416	938	1,354	9	15	12	52	117	169
20 to 30	302	423	725	30	36	33	1,381	2,012	3,393	29	32	31	173	252	424
30 to 40	227	226	453	22	19	21	979	1,374	2,353	20	22	21	122	172	294
40 to 50	169	132	301	17	11	14	732	711	1,443	15	11	13	92	89	180
50 to 60	104	80	184	10	7	8	538	449	987	9	7	9	67	56	123
60 to 70	68	64	132	7	6	6	395	350	745	8	6	7	49	44	93
Over 70	51	41	92	5	4	4	234	192	426	5	3	4	29	24	53
All ages	1,022	1,163	2,185	47	53	100	4,842	6,244	11,086	44	56	100	605	781	1,386
Average age	36.8	32.8	......	....	....	....	37.0	32.7	......	....	....	....	....	....	......

Source of contagium of consumption.—Of the 2,658 reported cases of consumption during the year 1902, the local health officers reported the source of contagium as follows: Following some previous sickness, as asthma, bronchitis, bronchial asthma, cold, catarrh, cough, cancer, change of life, following childbirth, female weakness, fistula and rectal abscess, hemorrhage, influenza, la grippe, measles, pneumonia, pleurisy and cough, result of an operation, smallpox and cold, suppressed menstruation, spinal disease, sore lip, typhoid fever, tubercular knee, and whooping-cough, 241; hereditary,* 157; caring for tubercular cow, 1; dissipation and drunkenness, 5; exposure, 44; traced to a former case, 127; from a case of tubercular meningitis, 1; injury, 9; inhalation of dust and vitiated air, 10; idiotic parents closely related, 1; overstudy and work, 6; using morphine, 1; outside jurisdiction, 57; unknown, 550, and not stated, 1,448.

Ages of fatal and non-fatal cases of consumption.—In Table 5 are shown the numbers of cases and deaths from consumption in Michigan in 1902, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age-groups,* showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in principal groups were of all deaths.

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* There is reason to believe that most of the reports which stated the disease to be "hereditary" were made because of the belief of the reporters in the transmission of the disease in that manner, but that most such reports are made without sufficient proof to satisfy any scientific investigator.

Table 6 shows that for the year 1902 and for the eight years, 1894-1901, the greatest per cent of deaths was in persons between twenty and thirty years of age, the next greatest per cent between thirty and forty years of age. Also that the per cent of deaths in each age-period is about the same in 1902 as in the eight years preceding.

Average age of decedents from consumption.—The average age of decedents from consumption in 1902 was 36.8 years for males, and 32.8 years for females. The average age of death of males for eight years, 1894-1901, was 37.0 years, and for females 32.7 years.

Duration of consumption.—Fatal and non-fatal cases.—By Table 7 it may be seen that from reports received for 1902 and for the years 1894-1901, which stated the interval between the time of being taken sick and the time of death from consumption, the largest per cent of both males and females were sick less than one year. The next highest per cent of decedents were sick from one to two years, and as the duration of sickness grew longer the per cent of deaths decreased. The average duration of fatal cases reported in the eight years, 1894-1901, was, for males 20 months and for females 21 months.

TABLE 7.—*Exhibiting by sex of patient, the duration in months and years, of fatal cases of sickness from consumption, in Michigan, during the year 1902, and the eight years 1894--1901, arranged in time periods. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of consumption.																					
Year.	Sex.	Average duration in months.	No. of cases included.	Duration of sickness:—Per cent of deaths in each period.																	
				All cases.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	Under one year.	1 to 2 yrs.	2 to 3 yrs.	3 to 4 yrs.	4 to 5 yrs.	Five years and over.
1902.	Males...	18	635	100	4.1	5.4	7.1	5.0	4.6	6.8	2.5	4.6	2.4	2.4	1.9	46.6	23.5	14.3	6.6	2.0	6.9
	Females	24	721	100	2.1	4.9	4.7	4.4	4.0	7.6	4.7	6.1	4.4	1.9	2.9	47.9	25.1	14.6	4.4	2.6	5.4
1894-1901.	Males...	20	3,024	100	5.5	4.6	4.8	5.5	4.9	8.2	3.9	3.7	3.6	2.9	2.4	49.9	24.1	12.4	5.2	2.3	6.1
	Females	21	4,186	100	3.7	4.4	6.1	5.6	5.0	6.7	4.6	4.3	4.9	2.7	2.8	50.9	24.0	11.6	5.7	2.2	5.7

By Table 8 may be seen that, from the reports of non-fatal cases of consumption during the eight years 1894-1901, the highest per cent were sick under one year, the next highest per cent were sick from one to two years, and as the duration grew longer the per cent of cases decreased. The average duration of sickness in non-fatal cases of consumption during the eight years 1894-1901 was, in males 16.1, and in females 18.7 months.

TABLE 8.—*Exhibiting, by sex of patient, the duration in months and years, of non-fatal cases (still sick) of consumption, in Michigan, in the year 1902, and for the years 1894--1901, as stated in the reports to the State Board of Health.*

Non-fatal cases of consumption.																					
Year reported.	Sex.	No. of cases included.	Duration of sickness.—Per cent of cases in each period.																		
			All periods.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 months.	11 months.	Under 1 yr.	1 to 2 yrs.	2 to 3 yrs.	3 to 4 yrs.	4 to 5 yrs.	5 to 9 yrs.	Ten years and over.
1902.	Males.....	99	100	5.0	5.0	7.0	2.0	1.0	3.0	1.0	5.0	4.0	4.0	1.0	38.4	32.3	14.1	9.1	5.1	1.0	0
	Females..	142	100	4.9	4.2	1.4	2.1	2.1	3.5	1.4	2.8	2.8	1.4	.7	27.5	32.4	12.7	10.6	8.5	5.6	6.3
1894-1901.	Males.....	419	100	5.0	4.8	7.9	4.5	4.5	2.6	4.1	6.0	3.3	6.0	5.3	53.9	23.9	12.9	5.3	1.4	1.7	1.2
	Females..	545	100	4.6	5.5	6.4	4.0	3.7	5.1	3.1	5.1	6.4	5.1	4.4	53.6	25.3	8.6	6.6	1.5	2.8	1.7

Cases of consumption reported as having recovered.—In the reports relative to consumption received at this office during the years 1894-1902, one hundred and twenty-eight cases were said to have recovered from the disease; eleven of these were reported in 1894, six in 1895, seven in 1896, nine in 1897, eight in 1898, eight in 1899, twenty-five in 1900, thirty-four in 1901, and twenty in 1902. These cases are tabulated according to sex, age and duration, in Table 9.

Average age of cases of consumption reported as having recovered.—The average age of cases that recovered during the year 1902, was 40 years for males and 35.7 years for females. For the eight years, 1894-1901, the average age was 31.2 years for males and 28.4 years for females. The ages of all cases that recovered were not reported.

Average duration of sickness of cases of consumption reported as having recovered.—The average duration of sickness of cases that recovered during the year 1902 was 13.3 months for males and 28.4 months for females. For the eight years, 1894-1901, the average duration was 9.9 months for males and 10.3 for females. The duration of sickness was not reported in all cases that recovered.

Information contained in final reports of cases of consumption during the year 1902.—One thousand seven hundred eighty-two final reports of cases of consumption in Michigan were received at this office. The information contained in these final reports is summarized below:

Of the 2,508 consumptives of whom the sex was stated, 1,147 were males and 1,361 were females.

Of the 2,293 consumptives of whom the color was stated, 2,220 were white, 43 black (negroes) and 30 red (indians).

The complexion of 1,310 consumptives was stated as: Black 9; dark 487, light 814.

The color of hair was stated in 1,300 instances as: Black 71, dark 534, brown 135, auburn 156, light 388, white or gray 16.

Of the civil condition of 1,861 consumptives, 1,124 were reported as married and 737 single.

Of 1,247 replies given in the reports to the question, "Were sputa of consumptives bacteriologically examined?" 715 were "no," 366 "yes," and 166 "unknown."

TABLE 9.—*Exhibiting, by sex, the ages of cases* reported as having recovered from consumption, and the duration of sickness, for the years 1894-1902.*

Males.		Females.			
Age in years.	Duration of sickness by months.	Age in years.	Duration of sickness by months.	Age in years.	Duration of sickness by months.
18	7	21	44	Not stated.	12
27	4	19	5	Not stated.	5
19	7	35	3	Not stated.	7
27	8	37	2	Not stated.	12
29	12	36	9	Not stated.	5
26	4	35	3	Not stated.	13
35	24	20	2	Not stated.	17
47	3	42	8		
35	1	31	13		
42	12	24	6		
24	16	4	14		
35	23	38	36		
21	10	6	2		
5	1	18	7		
16	12	24	8		
16	3	28	24		
22	1	62	17		
40	18	19	8		
45	4	43	12		
60	8	16	3		
64	9	42	8		
38	1	35	3		
26	5	20	8		
22	3	33	2		
16	6	33	4		
66	3	28	2		
22	20	17	3		
51	22	30	9		
40	11	32	6		
26	24	29	10		
58	6	31	12		
30	28	21	9		
35	20	45	9		
51	11	48	66		
14	Not stated.	39	47		
41	Not stated.	17	3		
34	Not stated.	20	Not stated.		
26	Not stated.	22	Not stated.		
35	Not stated.	16	Not stated.		
37	Not stated.	30	Not stated.		
Not stated.	46	17	Not stated.		
Not stated.	39	19	Not stated.		
Not stated.	4	43	Not stated.		
Not stated.	2	51	Not stated.		
Not stated.	2	23	Not stated.		
Not stated.	4	33	Not stated.		
Not stated.	13	32	Not stated.		
Not stated.	2	Not stated.	12		

* Sex, age, and duration, not stated in six cases reported as having recovered, and age and duration not stated in case of seven males and ten females.

In answer to the question, "Were persons infected from this patient?" in 373 instances the reply was "yes."

Results of bacteriological examinations of sputa of alleged consumptives in Michigan, in 1902.—The sputa of consumptives was reported examined in 366 cases. Of these 272 (or about 74 per cent), gave positive results, that is, the bacilli of tuberculosis were found, 22 cases (or about 6 per cent) gave negative results, and in 72 cases the result not stated or was unknown.

Location of the disease, reported for the year 1902, in 2,029 instances.

Lungs	1,648
Lungs and bowels	48
Lungs and throat	37
Lungs and larnyx	13
Lungs and stomach	9
Lungs and mesentery	7
Lungs, bowels and stomach	6
Lungs and intestines	6
Lungs and bronchi	5
Lungs and chest	4
Lungs and miliary	3
Lungs and fibroid	3
Lungs and liver	2
Lungs and brain	2
Lungs and rectum	2
Lungs, throat and brain	1
Lungs and glands	1
Lungs, bronchi and stomach	1
Lungs and heart	1
Lungs, liver and kidney	1
Lungs and knee	1
Lungs and pleura	1
Lungs, bladder and kidneys	1
Lungs and abdomen	1
Lungs and kidneys	1
General	53
Bowels	37
Peritoneum	11
Larynx	10
Intestines	10
Miliary	10
Stomach	9
Chest	9
Stomach and bowels	8
Fibroid	8
Glands	7
Abdomen	4
Throat	4
Bronchi	4
Acute	3
Bowels and miliary	3
Kidney	3
Catarrhal	3
Spine and elbow	2
Thorax	2
Liver	2
Chest and throat	2
Bladder	2
Spine	1
Vertebræ and lungs	1
Kidneys and intestines	1
Foot	1
Hip	1
Stomach and liver	1
Leg	1
Side	1
Bowels and kidney	1
Muscles	1
Septicemia	1
Larynx and intestines	1
Respiratory tract	1
Bowels and rectum	1
Bowels and peritoneum	1
Pelvic cavity	1
Ribs	1
Testicles, bladder and kidney	1

Disposal of sputa of patients.—Reports of the local health officers for the year 1902, show that in 656 cases the sputa were burned; in 171 cases the sputa were disinfected before being allowed to dry,—carbolic solution and chloride of lime were most generally used, and bichloride solution, ashes, formaldehyde, corrosive sublimate, sulphur, and zinc solution, were used in other instances; in 130 cases the disinfection or burning was doubtful, or only done for part of the time; in 85 cases the health officer reported it was unknown what was done; and in 264 cases the health officer reported positively that the sputa were *not* disinfected or burned, and did not state what was done; in twenty-two cases the sputa were buried. In the remaining cases nothing was reported about the disposal of the sputa.

Disinfection of rooms occupied by consumptives.—In answer to the question were the rooms occupied by consumptive patients disinfected. 1,424 replies were given for the year 1902 as follows:—

In 271 instances sulphur, three pounds or more per thousand cubic feet, was used; in 298 instances sulphur, the amount not stated or amount not enough; in 590 instances formaldehyde, to the amount of eight ounces per thousand cubic feet or over, was used; in 170 instances formaldehyde was used, but amount not known or amount not stated; in 56 instances sulphur and formaldehyde were both used, but in four of these instances the amount stated was not enough; in five instances formalin was used; in thirteen instances carbolic acid was used; in five instances carbolic acid and sulphur; in three instances creoline; in two instances carbolic acid and lime; in two instances Platt's chloride; in one instance each the following disinfectants were used,—sulphur and creoline, sulphur and formaldehyde, sulphur and Platt's chloride, sulphur and corrosive sublimate, sulphur and lime, carbolic acid and formaldehyde, bichloride of mercury, wood alcohol, and camphor.

Consumptive relatives, reported in 1902 in 1,344 instances.

Mother	56	Wife	17	Mother-in-law	1
Mother and sister	11	Wife and daughter	1	Grandparents	1
Mother and brother	4	Brother	70	Grandchild	1
Mother, brother and sister	3	Brother and sister	18	Grandfather	7
Mother and daughter	1	Brother, father and sister	5	Grandfather, uncle and aunt	1
Mother and aunts	1	Brother and son	1	Grandfather and father	1
Mother, sister and daughter	1	Brother, sister and cousin	1	Grandfather and two children	1
Father	46	Sister	100	Grandfather and aunt	1
Father and sister	5	Sister and brother-in-law	2	Grandfather and mother	1
Father, mother and sister	3	Sister, aunt and father	1	Grandfather and cousins	1
Father and brother	2	Sister and uncle	1	Grandmother	7
Father, mother, brother and sister	2	Uncle	13	Grandmother, brother and sister	1
Father and mother	9	Uncle and aunt	2	Grandmother and aunts	2
Father and uncle	1	Uncle and niece	1	Grandmother and father	1
Father, mother and brother	1	Uncle and cousin	1	Grandmother and cousins	1
Father, sister and niece	1	Uncle and mother	1	Grandmother and sister	1
Father and aunt	2	Aunt	13	Great uncle	1
Father, uncles, sister and grandfather	1	Aunt and cousin	3	Cousin	10
Husband	10	Son	11	Second cousin	1
Husband and son	1	Son and daughter	2	Cousin, aunt and grandparents	1
Husband and sister	1	Daughter	15	Family	3
Husband and father	1	Stepdaughter	1	Niece	3
Husband, son and father	1	Adopted daughter	1	Relatives	18
Husband and aunts	1	Children	5	Distant relatives	1
Husband, son and daughter	1	Stepfather	1	Unknown	112
Husband and brother	1	Stepmother	1	No relatives	706
		Brother-in-law	2		
		Daughter-in-law	1		

Occupation of consumptives, reported in 1902 in 1,586 instances.

Housewife	372	Engineer	4	Electrician	1
Farmer	282	Musician	4	Peddler	1
Laborer	164	Upholsterer	4	Minister	1
Servant	95	Saleslady	3	Priest	1
Student	93	Druggist	3	Sawyer	1
Clerk	53	Mason	3	Salesman	1
Housework	47	Foreman	3	Bottler	1
Millhand	37	Mail carrier	3	Waiter	1
Inmate of insane asylum	26	Inmate of county house	3	Carver	1
Dressmaker	25	Wheelmaker	3	Steamfitter	1
Carpenter	20	Mechanic	3	Collector	1
Saloonkeeper	17	Stenographer	3	Huckster	1
Machinist	16	Harnessmaker	3	Prostitute	1
Cigarmaker	16	Liveryman	3	Well digger	1
Bookkeeper	12	Railroad conductor	3	Designer	1
Printer	12	Shoemaker	3	Artist	1
Barber	12	Porter	3	Railroad employé	1
Merchant	11	Florist	3	Stockyard man	1
Tailor	11	Soldier	3	Tanner	1
Drayman	11	Fisherman	2	Fruit raiser	1
Lumberman	10	Trainer	2	Hunter	1
Baker	9	Drayman	2	Surfman	1
Butcher	8	Brakeman	2	Photographer	1
Sailor	7	Marble cutter	2	Clothier	1
Agent	7	Brass worker	2	Diver	1
Prisoner	7	Springmaker	2	Boilermaker	1
Waitress	7	Moulder	2	Contractor	1
Teamster	6	Coachman	2	Nun	1
Laundress	5	Grocer	2	Cooper	1
Miner	5	Hoopmaker	1	Brewer	1
Blacksmith	5	Organist	1	Editor	1
Weaver	4	Ticket agent	1	Undertaker	1
Nurse	4	Manufacturer	1	Builder	1
Traveler	4	Fruit buyer	1	Dentist	1
Basketmaker	4	Gardener	1	Gatetender	1
Telegrapher	4	Assistant	1	Wagonmaker	1
Scaler	4	Gambler	1	Appraiser	1
Printer	4	Janitor	1	Compositor	1
Cook	4	Saw filer	1	Patrolman	1
Doctor	4	Woodchopper	1	Draughtsman	1
Attorney	4	Postmaster	1	Hotel keeper	
Jeweler	4	Chiropodist	1		

Nationalities of consumptives, reported in 1,665 instances.

American	932	Scotch	19	Belgian	3
German	197	Negro	18	Scandinavian	2
Canadian	109	Polish	17	Welch	2
Irish	81	Norwegian	8	Dutch and French	1
English	59	Italian	7	Bohemian	1
Dutch	53	Dane	6	French and German	1
French	41	Austrian	4	Caucasian	1
Swede	36	French and Indian	4	Jew	1
Indian	32	Swiss	4	Armenian	1
Finnish	21	Prussian	3	Prussian	1

The method of disinfection of soiled articles was mentioned as follows:

Burned	192
Burned, boiled or washed	169
Burned, sulphur and formaldehyde	85
Burned and sulphur	84
Burned, sulphur and carbolic acid	82
Burned, sulphur and washed	14
Burned, sulphur and bichloride	2
Burned, sulphur, carbolic acid, washed	1
Burned, sulphur and lime	1
Burned, formaldehyde and washed	18
Burned, formaldehyde, carbolic acid	2
Burned and formaldehyde	2
Burned, formaldehyde and lime	2
Burned and carbolic acid	28
Burned, carbolic acid and washed	5
Burned, carbolic acid, chloride of lime	2
Burned and disinfected	49
Burned and fumigated	9
Burned and lime	9
Burned and bichloride solution	6
Burned and zinc solution	5
Burned and chloride of mercury	2
Burned and corrosive sublimate	1
Burned and sterilized	2
Formaldehyde	76
Formaldehyde, washed or boiled	20
Formaldehyde and fumigated	4
Formaldehyde and sulphur	3
Formaldehyde, sulphur, carbolic acid	1
Formaldehyde, sulphur, chloride of lime	1
Formaldehyde, sulphur and boiled	1
Formaldehyde, zinc solution and boiled	2
Formaldehyde and chloride of lime	1
Formaldehyde and carbolic acid	1
Formaldehyde and bichloride	1
Sulphur	57
Sulphur, boiled and washed	42
Sulphur and carbolic acid	7
Sulphur and zinc solution	5
Sulphur, zinc solution and fumigated	1
Sulphur, zinc solution, carbolic acid	1
Sulphur and corrosive sublimate	1
Sulphur and copperas	1
Sulphur and hot water	2
Fumigated	4
Fumigated and sterilized	3
Fumigated and boiled	2
Fumigated, boiled, zinc solution	1
Fumigated and chloride solution	1
Disinfected	69
Boiled	43
Boiled and carbolic acid	5
Boiled and bichloride	2
Boiled and sulphate of zinc	1
Boiled and cleaned	2
Washed	32
Washed and carbolic acid	3
Washed and chloride of lime	1
Carbolic acid	15
Bichloride solution	5
Zinc solution	3
Antiseptic solution	2
Corrosive sublimate	2
Platt's chloride	1
Chloride of lime	1
Calcium solution	1
Buried	5
Not disinfected	156
Unknown	36

For the year 1902 the disease was stated to have begun in 1,147 instances with—

Cold	435
Unknown	140
Bronchitis	109
Influenza	77
Pneumonia	73
Hemorrhage	56
La grippe	37
Cough	25
General debility	16
Gradual	15
Pleurisy	13
Cold and bronchitis	12
Cold and hemorrhage	11
Cold and cough	10
Cold and la grippe	9
After confinement	8
Bronchitis and pneumonia	7
Cold and pneumonia	6
Suppressed menstruation	6
Bronchitis and hemorrhage	5
Lung fever	5
Catarrh	4
Rheumatism	4
Asthma	3
Diarrhea	3
Influenza and pneumonia	3
Abscess	2
After typhoid fever	2
After measles	2
Bronchitis and asthma	2
Malarial fever	2
Cough and bronchitis	2
Change of life	2
Enlarged glands	2
Laryngitis	2
Pneumonia and hemorrhage	2
Pharyngitis	2
Pain in abdomen	2
Sore throat	2
Injury	2
Swelling in neck	2
After scarlet fever	1
After whooping-cough	1
After measles and whooping-cough	1
After diphtheria	1
Bronchitis and gastritis	1
Bronchitis and influenza	1
Bowel trouble	1
Cold and sore throat	1
Cold and fever	1
Cold and measles	1
Cold and asthma	1
Cold and catarrh	1
Cold and abscess	1
Coughed up a pin which was swallowed in childhood	1
Dropsy	1
La grippe and hemorrhage	1
Heart trouble	1
Pneumonia and measles	1
Pleuropneumonia	1
Pleurisy and la grippe	1
Stomach trouble and cough	1
Tonsillitis	1
Ulceration of cornea	1
Paralysis	1
Miscarriage	1

Bowel discharges were disposed of in 1,222 instances, as follows:

Buried	258
Vault	202
Unknown	133
Disinfected	110
Sewer	95
Disinfected and buried	84
Carbolic acid	54
Burned	43
Closet	40
Not disinfected	38
Vault and disinfected	34
Thrown out	29
Vault and lime	21
Lime	20
Chloride of lime	14
Disinfected and sewer	8
Ashes	7
Copperas	6
Vault and buried	4
Disinfected and closet	3
Vault and ashes	2
Vault and carbolic acid	2
Carbolic acid and lime	2
Destroyed	2
Burned and buried	2
Carbolic acid and copperas	2
Hot water	2
Copper and lime	1
Sulphur and zinc	1
Carbolic acid and sewer	1
Burned and boiled	1
Carbolic acid and burned	1

One health officer's impressions of public health work.—One of the health officers in Michigan evidently understands the instructions sent from the office of the State Board of Health, but he hesitates to enter so vigorously upon the work. In a letter to Secretary Baker, he says:

> "According to your circular letter, when a contagious disease is reported it means *git*. Am I wrong, or is the sentiment of the community wrong? People are hardly worked up in this section to the hurry up call of the health officer. Some of the surrounding health officers have been relieved of duty for promptness and thoroughness. I don't care to be in that category. Had I better use the more moderate means, or use the 'get there Eli' stroke upon any and all occasions?"

The faithful, conscientious and efficient health officer has much to contend with in the way of opposition, and should receive the encouragement and support of all good citizens in his efforts to restrict communicable diseases.

CONSUMPTION IS A DISEASE DANGEROUS TO THE PUBLIC HEALTH. PRECAUTIONS RELATIVE TO THE MOVEMENT OF COUGHING CONSUMPTIVES. RESOLUTIONS ADOPTED BY THE FIFTH GENERAL CONFERENCE OF HEALTH OFFICIALS IN MICHIGAN, AT ANN ARBOR, NOVEMBER, 1901.

Resolved, That, in the opinion of this Conference, consumption is a dangerous disease and communicable from one person to another, therefore "a disease dangerous to the public health" as specified in the laws of Michigan, requiring reports of and action concerning such a disease; and that it is the duty of all health officers, as well as all other public officials, to take cognizance of this disease whenever there is danger of its spreading in any manner, as is sometimes the fact.

Resolved, That, although the movement in cars and other public conveyances of persons sick with smallpox, diphtheria, and scarlet fever is forbidden by law, and the movement of persons sick with consumption has continued to be unrestricted, it is better, in the interests of the public safety, that the law requiring notice to the health officer of the entry into his jurisdiction of any dangerous communicable disease be considered as applying to "coughing" consumption.

Resolved, That all officials and persons in charge of public conveyances be requested to provide special cuspidors containing disinfectants for the use of coughing consumptives, and that the frequent disinfection with formaldehyde of all passenger cars, street cars, public hacks, and other public conveyances, be advised.

Consumption, the most dangerous communicable disease.—At the meeting of the National Conference of Charities and Correction in Detroit, June 22, 1902, Dr. Baker, Secretary of the Michigan State Board of Health said: "Not one of the common, so-called 'contagious' diseases is usually contracted by simple contact of the unbroken surface of a human body with the surface of an infected human body. Therefore the term 'contagious', implying as it does the spread of disease by contact, should be obsolete. A much better term is the single word 'communicable.'

"Of all communicable diseases consumption (pulmonary tuberculosis) is now the most dangerous. More people contract that disease than any other. Therefore anything, any statement, or any influence which belittles the importance of restricting the spread of consumption, does damage in the most vital point to the interests of the public health and safety.

"Improper housing and improper feeding of the poor are important evils to be done away with, because they lead to discomfort and lowered vitality, and tend to *spread* disease. But if the germs of tuberculosis were generally restricted, any amount of lowered vitality, because of improper housing and improper food, would not cause a single case of consumption.

"The essentials for the restriction of consumption are: First, the general recognition of the truth that consumption is the most dangerous communicable disease. Knowledge of that fact is the power without which consumption cannot be restricted. It is lack of action because of ignorance of this great truth—that consumption is spread from infected persons—that kills off the improperly housed and improperly fed poor. It is ignorance of that great truth that kills off the rich by tubercular disease, in spite of proper housing and proper feeding.

"It is the slow but gradual gaining of that precious knowledge by the common people, and action governed by that knowledge, that is reducing the mortality from consumption, as it is being reduced in Michigan.

"In order to be most useful to the public, it is essential that this important knowledge shall be gained by and shall govern the action of every coughing consumptive who otherwise is a constant source of danger. Therefore the consumptive should be promptly put in possession of that knowledge. This first essential cannot be fulfilled by the public unless every case of well-developed consumption shall be reported to the health officer. Every case reported should be promptly informed how to avoid reinfection of the patient and spreading the disease."

PNEUMONIA IN MICHIGAN IN 1902.

For the year 1902, reports relative to 105 cases, including 60 deaths, from pneumonia were received at this office from 46 localities in Michigan. These cases and deaths constituted only a very small proportion of the whole amount of sickness and of deaths from this disease in the State during 1902. The Vital Statistics Bulletins, published by the Secretary of State, indicate that in the year 1902 pneumonia caused more deaths in Michigan than any other disease; the number of deaths reported from pneumonia having been 2,907. This number includes deaths from lobar or croupous pneumonia, catarrhal, lobular or broncho-pneumonia, and typhoid pneumonia. (The office of the State Board of Health had reports of twenty deaths from typhoid pneumonia.) Reference to Table 1 of the article on "Sickness Statistics" in this report, shows that of the 5,979 weekly card reports received at this office during the year, nineteen per cent stated the presence of pneumonia under the observation of the reporter. By the same table it may be seen that twenty per cent stated the presence of consumption, under the observation of the physicians reporting; the statements relative to the two diseases indicating that pneumonia caused five per cent less *sickness* than did consumption. This, however, does not prove that there were a less number of cases of pneumonia because of the much longer duration of cases of consumption.

In the years preceding 1901, when the State Department Bulletins have shown more deaths from pneumonia than from consumption, the *final* compilation has shown a less number from pneumonia, some deaths at first attributed to pneumonia having been found later to have been chargeable to some other disease, the pneumonia having been only the immediate cause, another having been the main cause. But it seems probable that for the year 1902, as for the year 1901, this change will not be enough to take pneumonia from the first place in the list of causes of deaths.

The fact that pneumonia is the most dangerous communicable disease in Michigan is the reason why this article on the reports, or lack of reports, of its presence in localities in Michigan is here published. It is to be hoped that the time may soon come when the householders and physicians throughout Michigan will very much more generally act for the interests of the public health than, by this report, they are shown to have done in 1902. When that time comes, it will be interesting and useful to compare the results, as shown in the mortality statistics, with the results of the inaction in the year 1902.

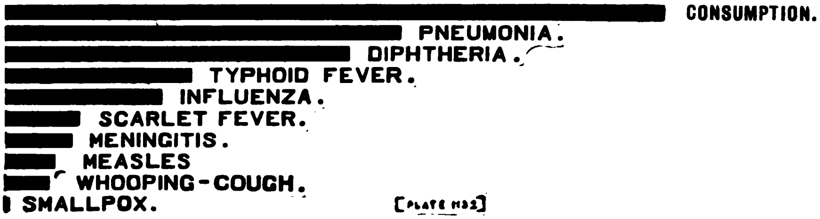
MENINGITIS IN MICHIGAN IN 1902.

During the year ending December 31, 1902, meningitis was reported to the Secretary of the State Board of Health in 394 localities in Michigan in which there were reported to have occurred 632 cases, including 598 deaths. It thus appears that, as a rule, only the fatal cases were reported. The reports relating to meningitis have been compiled under the various names reported, viz.: cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, tubercular meningitis, and traumatic meningitis, endeavoring by such separate statements to study the characteristics of the disease reported under each name, in case any difference statistically can be detected.

Table 1 shows that those cases and deaths reported as from simple meningitis were more numerous than those reported from any other title; and that the cases and deaths reported as from spinal meningitis were less than those reported from any other title excepting traumatic, of which there were eight cases, all of which proved fatal.

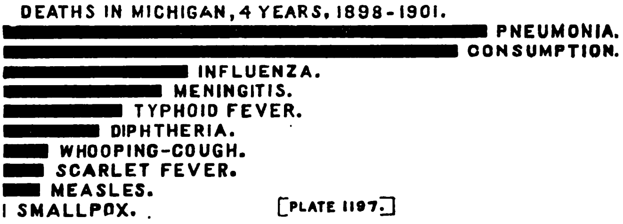
The importance of restricting meningitis.—In recent years meningitis, compared with other diseases, has come to be of much greater importance than formerly. This is graphically shown by comparison of the two diagrams published herewith, Plates 1132 and 1197, the one exhibiting the relative importance of meningitis compared with other dangerous communicable diseases during the ten years 1888-1897, the other, during the four years 1898-1901.

DEATHS IN MICHIGAN, 10 YEARS, 1888-97.



[PLATE 1132]

(The engraver has not conformed to instructions in engraving diagram 1197, therefore it may not be on the same scale as the diagram 1132; but the relative importance of each disease in that period of years is accurately shown.)



Relating to nomenclature, cases in the same locality, same outbreak, having the same symptoms, have been variously called cerebro-spinal meningitis, cerebral meningitis, spinal meningitis, or meningitis. It thus appears that while in some instances a distinction based on certain characteristics of the disease, is made, it more frequently occurs that the above mentioned terms are used indiscriminately in designating any form of the disease, except sometimes the tubercular, and the traumatic. As the prevalence of meningitis in the State has not been general, except during epidemic periods, health officers and physicians have not been given the opportunity of becoming familiar in their general practice with the causes, modes of communication, etc., of this disease as with some of the other communicable diseases whose prevalence each year is common and expected. When a thorough knowledge of this disease becomes general, better and more satisfactory reports may be expected.

TABLE 1.—*Cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, tubercular meningitis and traumatic meningitis in Michigan. The number of reported localities, cases and deaths, the average number of cases and deaths per locality, and the per cent of cases which proved fatal in 1902; also the total number of cases and of deaths from meningitis including those reported as tubercular and traumatic meningitis.*

Year 1902.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases reported.
Cerebro-spinal meningitis.....	107	160	1.50	140	1.31	87.50
Cerebral meningitis...........	48	77	1.60	76	1.58	98.70
Meningitis.....................	131	239	1.82	233	1.78	97.49
Spinal meningitis..............	42	52	1.24	47	1.12	90.38
Total meningitis other than tubercular and traumatic...	328	528	1.61	496	1.51	93.94
Tubercular meningitis.........	58	96	1.66	94	1.60	96.88
Traumatic meningitis..........	8	8	1.00	8	1.00	100.00
Total meningitis...........	394	632	1.60	598	1.52	94.62

TABLE 2.—*Numbers of cases and deaths reported from meningitis,* tubercular meningitis, traumatic meningitis and the total cases and deaths from all forms of reported meningitis per 100,000 persons living in the State and in each county in Michigan during the year, 1902.*

Counties.	Estimated population.*	Meningitis.†				Tubercular meningitis.				Traumatic meningitis.				Total meningitis.			
		No. of reported		No. per 100,000 population of		No. of reported		No. per 100,000 population of		No. of reported		No. per 100,000 population of		No. of reported		No. per 100,000 population of	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
State	2,480,762	528	496	21.3	20.0	96	94	3.9	3.8	8	8	.3	.3	632	598	25.5	24.1
Alcona	5,781	1	1	17.3	17.3	....	....	....	....	....	....	....	....	1	1	17.3	17.3
Alger	7,358	4	1	54.4	13.6	2	2	27.2	27.2	....	....	....	....	6	3	81.5	40.8
Allegan	38,686	8	8	20.7	20.7	1	1	2.6	2.6	....	....	....	....	9	9	23.3	23.3
Alpena	18,432	3	3	16.3	16.3	....	....	....	....	....	....	....	....	3	3	16.3	16.3
Antrim	17,944	5	5	27.9	27.9	....	....	....	....	....	....	....	....	5	5	27.9	27.9
Arenac	10,779	1	1	9.3	9.3	....	....	....	....	....	....	....	....	1	1	9.3	9.3
Baraga	4,350	2	2	46.0	46.0	1	1	23.0	23.0	....	....	....	....	3	3	69.0	69.0
Barry	22,118	8	8	36.2	36.2	1	1	4.5	4.5	....	....	....	....	9	9	40.7	40.7
Bay	62,734	14	14	22.3	22.3	....	....	....	....	....	....	....	....	14	14	22.3	22.3
Benzie	10,221	2	2	19.6	19.6	1	1	9.8	9.8	....	....	....	....	3	3	29.4	29.4
Berrien	50,339	7	7	13.9	13.9	3	2	6.0	4.0	....	....	....	....	10	9	19.9	17.9
Branch	28,343	3	2	10.6	7.1	....	....	....	....	1	1	3.5	3.5	4	3	14.1	10.6
Calhoun	49,927	6	6	12.0	12.0	2	2	4.0	4.0	....	....	....	....	8	8	16.0	16.0
Cass	20,776	....	....	....	....	1	1	4.8	4.8	....	....	....	....	1	1	4.8	4.8
Charlevoix	14,718	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cheboygan	16,144	6	6	37.2	37.2	....	....	....	....	....	....	....	....	6	6	37.2	37.2
Chippewa	23,338	5	5	21.5	21.5	....	....	....	....	....	....	....	....	5	5	21.5	21.5
Clare	8,486	3	3	35.4	35.4	....	....	....	....	....	....	....	....	3	3	35.4	35.4
Clinton	24,760	3	2	12.1	8.1	....	....	....	....	....	....	....	....	3	2	12.1	8.1
Crawford	3,019	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Delta	25,417	6	6	23.6	23.6	4	4	15.7	15.7	1	1	3.9	3.9	11	11	43.3	43.3
Dickinson	18,932	8	6	42.3	31.7	1	1	5.3	5.3	....	....	....	....	9	7	47.5	36.9
Eaton	31,352	8	8	25.5	25.5	....	....	....	....	....	....	....	....	8	8	25.5	25.5
Emmet	17,777	7	7	39.4	39.4	....	....	....	....	....	....	....	....	7	7	39.4	39.4
Genesee	42,220	5	5	11.8	11.8	2	2	4.7	4.7	....	....	....	....	7	7	16.6	16.6
Gladwin	7,116	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Gogebic	17,622	1	1	5.7	5.7	....	....	....	....	....	....	....	....	1	1	5.7	5.7
Grand Traverse	21,465	4	4	18.6	18.6	....	....	....	....	1	1	4.7	4.7	5	5	23.3	23.3
Gratiot	30,259	8	6	26.4	19.8	2	2	6.6	6.6	....	....	....	....	10	8	33.0	26.4
Hillsdale	29,729	2	2	6.7	6.7	....	....	....	....	....	....	....	....	2	2	6.7	6.7
Houghton	73,353	12	12	16.4	16.4	9	9	12.3	12.3	....	....	....	....	21	21	28.6	28.6
Huron	34,796	6	6	17.2	17.2	1	1	2.9	2.9	1	1	2.9	2.9	8	8	23.0	23.0
Ingham	39,860	9	9	22.6	22.6	....	....	....	....	....	....	....	....	9	9	22.6	22.6
Ionia	34,165	7	5	20.5	14.6	....	....	....	....	....	....	....	....	7	5	20.3	14.6
Iosco	9,548	4	4	41.9	41.9	....	....	....	....	....	....	....	....	4	4	41.9	41.9
Iron	10,220	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Isabella	23,230	3	3	12.9	12.9	1	1	4.3	4.3	....	....	....	....	4	4	17.2	17.2
Jackson	48,782	13	13	26.6	26.6	1	1	2.0	2.0	1	1	2.0	2.0	15	15	30.7	30.7
Kalamazoo	45,060	6	3	13.3	6.7	2	2	4.4	4.4	....	....	....	....	8	5	17.8	11.1
Kalkaska	7,629	1	1	13.1	13.1	....	....	....	....	....	....	....	....	1	1	13.1	13.1
Kent	132,302	38	34	28.7	25.7	7	7	5.3	5.3	....	....	....	....	45	41	34.0	32.0

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* Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

† Includes cerebral meningitis, cerebro-spinal meningitis, spinal meningitis, and meningitis.

TABLE 2.—CONCLUDED.

Counties.	Estimated population.*	Meningitis.†				Tubercular meningitis.				Traumatic meningitis.				Total meningitis.			
		No. of reported		No. per 100,000 population of		No. of reported		No. per 100,000 population of		No. of reported		No. per 100,000 population of		No. of reported		No. per 100,000 population of	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Keweenaw	3,353	1	1	29.8	29.8	....	....	....	....	....	....	....	....	1	1	29.8	29.8
Lake	4,643	1	1	21.5	21.5	....	....	....	....	....	....	....	....	1	1	21.5	21.5
Lapeer	27,229	2	2	7.3	7.3	2	2	7.3	7.3	....	....	....	....	4	4	14.6	14.6
Leelanau	10,882	1	1	9.2	9.2	....	....	....	....	....	....	....	....	1	1	9.2	9.2
Lenawee	48,360	6	6	12.4	12 4	2	2	4.1	4.1	....	....	....	....	8	8	16.5	16.5
Livingston	19,406	3	3	15.5	15.5	1	1	5.2	5.2	....	....	....	....	4	4	20.6	20.6
Luce	3,193	1	1	31.3	31.3	....	....	....	....	....	....	....	....	1	1	31.3	31.3
Mackinac	7,857	1	1	12.7	12.7	....	....	....	....	....	....	....	....	1	1	12.7	12.7
Macomb	33,528	9	9	26.8	26.8	....	....	....	....	....	....	....	....	9	9	26.8	26.8
Manistee	28,434	6	4	20.7	14.1	2	2	7.0	7.0	....	....	....	....	8	6	28.1	21.1
Marquette	42,313	13	12	30.7	28.4	9	8	21.3	18.9	1	1	2.4	2.4	23	21	54.4	49.6
Mason	19,037	3	3	15.8	15.8	....	....	....	....	1	1	5.3	5.3	4	4	21.0	21.0
Mecosta	20,681	6	6	29.0	29.0	....	....	....	....	....	....	....	....	6	6	29.0	29.0
Menominee	28,144	7	7	24 9	24.9	2	2	7.1	7.1	....	....	....	....	9	9	32.0	32.0
Midland	14,845	4	4	26.9	26.9	....	....	....	....	....	....	....	....	4	4	26.9	26.9
Missaukee	10,088	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monroe	32,612	12	12	36.8	36.8	....	....	....	....	....	....	....	....	12	12	36.8	36.8
Montcalm	32,286	5	5	15.5	15 5	....	....	....	....	....	....	....	....	5	5	15.5	15.5
Montmorency	3,498	1	1	28.6	28.6	....	....	....	....	....	....	....	....	1	1	28.6	28.6
Muskegon	36,980	4	3	10.8	8.1	2	2	5,4	5.4	....	....	....	....	6	5	16.2	13.5
Newaygo	17,189	2	2	11.6	11.6	....	....	....	....	....	....	....	....	2	2	11.6	11.6
Oakland	45,496	3	3	6.6	6.6	2	2	4.4	4.4	1	1	2.2	2.2	6	6	13.2	13.2
Oceana	16,658	2	2	12.0	12.0	....	....	....	....	....	....	....	....	2	2	12.0	12.0
Ogemaw	8,473	1	0	11.8	0	....	....	....	....	....	....	....	....	1	0	11.8	0
Ontonagon	5,971	2	2	33.5	33.5	....	....	....	....	....	....	....	....	2	1	33.5	33.5
Osceola	18,319	5	4	27.3	21.8	...	....	....	....	....	....	....	....	5	4	27.3	21.8
Oscoda	1,356	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Otsego	6,633	2	1	30.2	15.1	....	....	....	....	....	....	....	....	2	1	30.2	15.1
Ottawa	39,859	12	12	30.1	30.1	....	....	....	....	....	....	....	....	12	12	30.1	30.1
Presque Isle	9,787	1	1	10.2	10.2	....	....	....	....	....	....	....	....	1	1	10.2	10.2
Roscommon	1,829	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
Saginaw	81,014	12	12	14.8	14.8	1	1	1.2	1.2	....	....	....	....	13	13	16.5	16.5
Sanilac	35,423	4	4	11.3	11.3	3	3	8.5	8.5	....	....	....	....	7	7	19.8	19.8
Schoolcraft	8,141	1	1	12.3	12.3	....	....	....	....	....	....	....	....	1	1	12.3	12.3
Shiawassee	34,202	6	5	17.5	14.6	1	1	2.9	2.9	....	....	....	....	7	6	20.5	17.5
St. Clair	55,528	9	8	16.2	14.4	2	2	3.6	3.6	....	....	....	....	11	10	19.8	18.0
St. Joseph	23,489	5	5	21.3	21.3	1	1	4.3	4.3	....	....	....	....	6	6	25.5	25.5
Tuscola	36,380	6	5	16.5	13.7	....	....	....	....	....	....	....	....	6	5	16.5	13.7
Van Buren	34,008	5	5	14.7	14.7	....	....	....	....	....	....	....	....	5	5	14.7	14.7
Washtenaw	49,177	5	4	10.2	8.1	2	2	4.1	4.1	....	....	....	....	7	6	14.2	12.2
Wayne	367,565	125	122	34.1	30.4	22	22	6.0	6.0	....	....	....	....	147	144	40.0	39.2
Wexford	17,775	5	5	28.1	28.1	....	....	....	....	....	....	....	....	5	5	28.1	28.1

* Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

† Includes cerebral meningitis, cerebro-spinal meningitis, spinal meningitis, and meningitis.

As is shown in Table 1, meningitis (including traumatic and tubercular meningitis) was reported present in 394 localities in Michigan in 1902. In these localities 632 cases of sickness were reported to have occurred, of which 598 were fatal; thus indicating that in 1902, as in the three previous years, 1899, 1900 and 1901, as a rule, only fatal cases were reported; there being an average of 1.60 cases of sickness and 1.52 deaths per locality, and a general fatality from meningitis in the State of 94.62 deaths per one hundred cases *reported.*

Distribution of reported meningitis by counties throughout the State.—Table 2 shows the amount of reported sickness and deaths in each county in the State during the year 1902, from meningitis. The county having the greatest number of reported cases of sickness and of deaths was Wayne, where 147 cases, of which 144 died, were reported to have occurred. From each of thirteen counties in the State, Alcona, Arenac, Cass, Gogebic, Kalkaska, Keweenaw, Lake, Leelanau, Luce, Mackinac, Montmorency, Presque Isle and Schoolcraft there was reported but one fatal case.

It is shown in Table 2, that the highest death-rate (69.0) was in Baraga county, and the lowest, in which any death occurred (4.8) was in Cass county. No case was reported as having occurred in the counties of Charlevoix, Crawford, Gladwin, Iron, Missaukee, Oscoda, and Roscommon.

Table 3 shows a decrease in the prevalence of meningitis since 1899, the epidemic year.

Good authorities state that, with reference to measures for its restriction, epidemic cerebro-spinal meningitis should be placed in the same category as phthisis pulmonalis, and effective effort should be exercised in the restriction and prevention of this disease as in other dangerous communicable diseases. It is, therefore, desirable to have all cases occurring in the State reported in detail to the Secretary of the State Board of Health, that the compilation of statistics relating to this disease may be more complete and useful.

TABLE 3.—*Exhibiting for the years 1899, 1900, 1901 and 1902, a comparison of all forms of meningitis in the numbers of reported localities, cases and deaths, the average numbers of cases and deaths per locality; and per cent of reported cases which proved fatal in each of the years.*

Year.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases reported.
1899	544	1,306	2.40	1,079	1.98	82.62
1900	451	747	1.66	688	1.53	92.10
1901	409	614	1.50	594	1.45	96.74
1902	394	632	1.60	598	1.52	94.62

Reported meningitis by months.—The first line in Table 4 shows the number of cases which began in each month of the year 1902. The second line of figures shows the number of cases reported sick in any part of each month. As some of the cases were sick longer than one month, they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1902. The last line of Table 4 gives by months, the average temperature, at stations in Michigan, in 1902, which may serve, in a limited way, as a basis for showing the relation of the prevalence of meningitis to temperature.

TABLE 4.—*Exhibiting the number of cases of meningitis which began and the number which were present in each month of the year 1902, in Michigan. (Compiled from reports to this office by health officers and physicians.) Also, by months, the average temperature, at stations in Michigan, in 1902.*

Cases.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Began....................	24	37	50	52	44	31	47	32	33	21	30	15
Present....................	61	69	89	95	84	59	84	72	64	52	57	41
Av. Temp....................	22.93	21.11	37.45	44 95	57.06	61.53	71.09	65.62	59.54	49.54	44.42	26.41

Of the 495 persons who died of meningitis in the State during the year 1902, the ages of whom were reported to this office, the largest percentage of deaths, 290, or fifty-nine per cent, were of ages under five years; and 345, or seventy per cent, died at ages under nine years, indicating that the disease exists largely among children. The average age of decedents included under the title meningitis was, for males 10.7, and for females 10.6 years.

Of the 93 persons who died of tubercular meningitis in the State during the year 1902, the ages of whom were reported to this office, the largest percentage of deaths, 54, or fifty-eight per cent, were of ages under five years; and 70, or seventy-five per cent, died at ages under nine years. The average age of decedents from tubercular meningitis was, for males 7.6 and for females 8.9 years.

Table 6 shows that but twenty-six cases, of whom the ages were reported to this office, recovered from meningitis. The limited number of non-fatal cases reported makes impossible, in a single year, a satisfactory study of the ages of non-fatal cases; but the table may serve as a starting point.

Table 7 shows that for the year 1902 the average duration of fatal cases of meningitis was for males 11.5 days, and for females 13.6 days.

The average duration of fatal cases of tubercular meningitis was for males 21.9 days, and for females 27.1 days.

In Table 8 it may be noticed that the duration of but twenty-five non-fatal cases were reported which indicates as in Table 6, relative to the age of non-fatals, that a too limited number of non-fatal cases are reported to obtain from the cases in a single year any valuable conclusions on the duration of sickness from the disease.

TABLE 5.—*Exhibiting by sex, in certain age-groups, the reported number of deaths from meningitis* and tubercular meningitis and the per cent the deaths in each group were of the total number of deaths reported for the disease; also the average age of fatal cases and total number of deaths included. (Compiled from such reports for the year 1902 which stated the age.)*

Meningitis.*

Year.	Sex.	Average age of fatal cases.	No. of cases included.	Age.—In periods of years. Number and per cent of fatal cases in each period of age.											
				All ages.	Under 5 years	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males....	10.7	265	......	164	22	17	10	6	7	7	9	4	4	15
	Females.	10.6	230	......	126	33	12	18	6	7	6	3	4	4	11
1902.	Per cent the fatal cases in each age-group were of all fatal cases of known ages.			100	62	8	6	4	2	3	3	3	2	2	6
				100	55	14	5	8	3	3	3	1	1	2	5

Tubercular meningitis.

Year.	Sex.	Average age of fatal cases.	No. of cases included.	Age.—In periods of years. Number and per cent of fatal cases in each period of age.											
				All ages.	Under 5 years	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males....	7.6	41	......	28	3	1	4	1	1	0	0	2	1	0
	Females.	8.9	52	......	26	13	3	2	2	2	0	2	1	0	1
1902.	Per cent the fatal cases in each age-group were of all fatal cases of known ages.			100	68	7	2	10	2	2	0	0	5	2	0
				100	50	25	5	3	4	4	0	3	2	0	2

*Includes cerebral meningitis, cerebro-spinal meningitis, spinal meningitis and meningitis.

TABLE 6.—*Exhibiting by sex, in certain age-groups, the reported number of persons who recovered from meningitis* in Michigan during the year 1902; also the average age and number of cases included. (Compiled from all reports for the year 1902 which stated the age.)*

Meningitis.*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Number and per cent of (non-fatal) cases in each period of age.											
				All ages.	Under 5 years	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males....	5.2	13	......	8	4	0	1	0	0	0	0	0	0	0
	Females.	12.0	13	......	5	2	2	1	1	0	1	0	0	1	0
1902.	Per cent the non-fatal cases in each age-group were of all non-fatal cases of known ages.			100	62	31	0	8	0	0	0	0	0	0	0
				100	38	15	15	8	8	0	8	0	0	8	0

* Includes cerebral meningitis, cebro-spinal meningitis, spinal meningitis and meningitis.

TABLE [illegible].—Exhibiting, by sex, in per cent the duration in days of fatal cases of sickness from meningitis and tubercular meningitis in Michigan in the year 19[illegible]. The number and per cent of deaths [illegible] in [illegible] group. Compiled from those reports which [illegible] the length of time the patient was sick.

Meningitis.*

Year	Sex	Average duration of fatal cases	No. of cases included	Duration of sickness.—Number and per cent of fatal cases in each period of days.											
				All periods	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] days and over.
19[illegible]	Males	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		1	1	1	[illegible]
	Females	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]				2	4
19[illegible]	Per cent of deaths in each period of age.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	1	[illegible]	[illegible]
				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	[illegible]	[illegible]	2

Tubercular meningitis.

Year	Sex	Average duration of fatal cases	No. of cases included	Duration of sickness.—Number and per cent of fatal cases in each period of days.											
				All periods	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] days and over.
19[illegible]	Males	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		1	[illegible]	[illegible]	[illegible]
	Females	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1	1	[illegible]	[illegible]
19[illegible]	Per cent of deaths in each period of age.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]

*Includes cerebral meningitis, cerebro-spinal meningitis, spinal meningitis and meningitis.

TABLE [illegible].—Exhibiting, by sex, in per cent and by number and per cent, the duration in days of non-fatal cases of [illegible] in Michigan, during the year 19[illegible]. Compiled from those reports which stated the time the patient was sick.

Meningitis.*

Year	Sex	Average duration of non-fatal cases	No. of cases included	Duration of sickness.—Number and per cent of non-fatal cases in each period of days.											
				All periods	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] days and over.
19[illegible]	Males	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2
	Females	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	1	1	[illegible]	[illegible]	[illegible]	1
19[illegible]	Per cent of non-fatal cases in each period of age.			[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	[illegible]	[illegible]	[illegible]

*Includes meningitis, [illegible] meningitis, cerebro-spinal meningitis, spinal meningitis, and meningitis.

CAUSE, OR SOURCE OF CONTAGIUM OF MENINGITIS.

TABLE 9.—*Exhibiting, for each of the differently named sorts of meningitis in Michigan, in 1902, the reported cause, origin, or source of contagium.*

Alleged source, origin, or cause.	Total meningitis.	Cerebral meningitis.	Cerebro-spinal meningitis.	Meningitis.	Spinal meningitis.	Tubercular meningitis.
Not stated	329	38	71	134	30	56
Ill defined	13	4	0	8	1	0
Unknown	156	14	54	50	12	26
Cold	19	2	7	4	3	3
Pneumonia	9	2	4	2	1	0
Sister had pneumonia	1	0	1	0	0	0
Influenza	5	0	4	1	0	0
Middle ear disease	7	1	1	5	0	0
Bronchitis	3	0	2	1	0	0
Rheumatism	2	1	0	1	0	0
Cholera infantum	2	1	0	1	0	0
Dysentery	2	0	0	2	0	0
Intestinal disease	4	1	1	2	0	0
Diarrhea	4	0	0	4	0	0
Measles	1	1	0	0	0	0
Smallpox	1	0	1	0	0	0
Mumps	1	1	0	0	0	0
Typhoid fever	3	0	2	1	0	0
Whooping-cough	2	0	1	1	0	0
Scarlet fever	1	0	1	0	0	0
Purulent ophthalmia	1	0	0	1	0	0
Syphilis	2	1	0	1	0	0
Venereal infection	1	0	1	0	0	0
Tubercular origin	3	0	0	1	0	2
Consumption	1	0	0	0	0	1
Consumption in family	6	0	2	0	0	4
Hemorrhage	1	0	0	1	0	0
Injury	21	4	1	5	3	0
Had teeth pulled	1	0	0	1	0	0
Operation	1	1	0	0	0	0
Unsanitary conditions	6	2	2	2	0	0
Poorly nourished	1	0	0	1	0	0
Bright's disease	1	0	0	1	0	0
Paralysis	1	0	1	0	0	0
Spasms	2	0	0	0	1	1
Epileptic fits	1	0	0	1	0	0
Overheat	2	0	1	1	0	0
Overwork	3	1	0	2	0	0
Miscarriage	1	0	0	1	0	0
Non-development of skull	1	0	0	1	0	0
Stomach trouble	1	0	0	1	0	0
Traced to a former case	4	1	2	1	0	0
Hereditary	5	1	0	0	1	3

Source of contagium of meningitis.—Table 9 is an attempt to learn something of the source of contagium of the disease. In 1902, as in the three years previous, 1899, 1900 and 1901, it has been difficult to obtain information on this question. As can be seen by this table, of the 632 cases of meningitis which occurred in the State in 1902, in 329 instances, no source of contagium was reported by the local health officer; in 13 instances the source was ill defined, and in 156 instances the health officer reported the source as "unknown." Nineteen cases were attributed to cold, and 26 cases to some of the cold-weather diseases, as follows:—pneumonia, 9; influenza, 5; bronchitis. 3; rheumatism, 2, and middle ear disease, 7. One case was reported to have been contracted from a sister who had pneumonia. Twelve cases were attributed to some of the warm-weather diseases, as follows:—cholera infantum, 2; dysentery, 2; intestinal disease, 4; diarrhea, 4. Twenty-four cases were attributed to some of the dangerous communicable diseases, as follows:—measles, 1; smallpox, 1; mumps, 1; typhoid fever, 3; whooping-cough, 2; scarlet fever, 1; purulent ophthalmia, 1; syphilis, 2; venereal infection, 1; tubercular origin, 3; consumption, 1; hemorrhage, 1; six were attributed to consumption in the family, and four traced to a former case. Twenty-two were attributed to a variety of causes, as follows:—Unsanitary conditions, 6; poorly nourished, 1; result of an operation, 1; had teeth pulled, 1; Bright's disease, 1; paralysis, 1; spasms, 2; epilepsy, 1; overheat, 2; overwork, 3; miscarriage, 1; non-development of skull, 1; and stomach trouble, 1. Twenty-one were attributed to an injury, and five to heredity.

It must be seldom that the spread of meningitis can be traced directly to a preceding case of meningitis. In fact, to the Secretary of the State Board of Health, it seems that it may be seldom that meningitis is spread directly from a well-developed case of meningitis; because he sees no way whereby the germs can pass from the coverings of the brain and spinal cord of one person to those of another person. Probably the germs enter the body by way of the nose and throat, and that they are spread from the nose and throat of the infected person. After meningitis is developed the germs may no longer be present in the nose or throat.

There are two quite distinct views possible as to the causation of meningitis. Prominent medical authors seem to consider that epidemic cerebro-spinal meningitis is caused by one specific micro-organism,—the diplococcus intracellularis meningitidis. Another view is that the micro-organism of any inflammatory disease to which the human body is subject, if it gains access to the meninges may cause meningitis. According to this view a person sick with any such communicable disease as pneumonia, influenza, or tuberculosis, may be the source of the germs which in the same or another person may cause meningitis. According to this view, whenever those diseases are epidemic or unusually prevalent, meningitis is also likely to be unusually prevalent. The statistics in this State have, several times, illustrated the truth of this proposition. In this connection the foregoing summary is interesting,—commencing with the words "Nineteen cases were attributed to cold," etc.

These facts, however, are also consistent with the above first mentioned view,—that the diplococcus intracellularis meningitidis is the specific cause of meningitis; because the same conditions in the environment, such as the meteorological conditions, which tend to favor the introduction into human bodies of the germs of the other communicable diseases may also tend to favor the introduction of the diplococcus of meningitis.

TYPHOID FEVER IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1902.

During the year ending December 31, 1902, there were reported to the Secretary of the State Board of Health 878 outbreaks of typhoid fever in 660 localities in Michigan in which there were reported to have occurred 2,456 cases, including 596 deaths. Of these deaths, 22 were reported to have been from typhoid pneumonia.

Notwithstanding the marked improvement secured both in promptness and in accuracy of reports of local health officials to the central office, not all cases of sickness from typhoid fever are yet reported. For instance, in 1902, in Bay City, Sault Ste. Marie, Muskegon and Detroit, only the deaths were reported. Statistics of the relation of deaths to cases in hospitals generally indicate that usually there are about ten cases to one death; therefore it is probable that there occurred in Michigan in 1902, about five thousand nine hundred and sixty cases of typhoid fever. Reports of all cases cannot be made by local health officers until the people generally fully understand the need of reporting to the local health officer every case of sickness from this "disease dangerous to the public health," for such typhoid fever really is. The restriction of the disease cannot be effected until such reports are made; as soon as the people generally shall coöperate, the disease will be restricted.

Not only about one-half of the cases, but not even all the deaths are reported directly to the office of the Secretary of the State Board of Health by local health officers.

The Vital Statistics Division of the State Department reports to the State Board of Health each month the deaths from dangerous communicable diseases including typhoid fever, typho-malarial fever and typhoid pneumonia; therefore, a considerable proportion of the deaths shown to have been reported to the State Board of Health were first reported to the State Department. It is believed that nearly all deaths that occur are now, under the new law, reported to the Secretary of State; and of these about two-thirds of all the deaths, reported to the Secretary of State, are found to have been previously reported as cases of sickness to the Secretary of the State Board of Health, nearly all of them promptly as the cases occurred. And the proportion of the deaths found to have been reported as cases of sickness is constantly increasing.

Definition of the term "outbreak" as used in this article.—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area.

TYPHOID FEVER IN 1902 COMPARED WITH PREVIOUS YEARS.

Comparisons with previous years, to ascertain the comparative increase or decrease of the prevalence of typhoid fever in this State, are interesting and instructive, and they would be more so if there existed a fixed basis on which to found such comparisons. From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by the local health officials throughout the State to furnish in their reports the information desired by the State Board. It is, however, still impossible to determine the exact increase or decrease of prevalence of the disease in this State by comparisons of the numbers of outbreaks of the disease, and the cases reported to this office year by year. But by means of the statistics of *deaths* it will soon be possible to make comparisons one year with another; because under the new law nearly all the deaths are returned to the Secretary of State, and by using the statistics of those in connection with the statistics of the office of the State Board of Health, a basis of comparison of the years will soon be possible. Some of the difficulties in the way of the immediate accomplishment of this are the different methods of compiling in the two offices; thus, for instance, a few deaths considered by the office of the State Board of Health as from typhoid fever were ***probably*** compiled in the State Department as from pneumonia, the returns reading "typhoid pneumonia."

A COMPARISON OF DEATHS FROM TYPHOID FEVER IN MICHIGAN DURING THE YEAR 1902 REPORTED TO THE OFFICE OF THE STATE BOARD OF HEALTH, WITH THOSE REPORTED TO THE DIVISION OF VITAL STATISTICS, IN THE STATE DEPARTMENT.

Reported to the State Board of Health.

Deaths from typhoid fever, typhoid pneumonia, and typho-malarial fever in 1902 (also includes those deaths reported first to the Secretary of State)	596

Reported to the State Department, Division of Vital Statistics.

Deaths from typhoid fever in 1902 (includes typho-malarial fever)	592

The foregoing statement is based upon the ephemeral publication, the Bulletin of Vital Statistics; the final compilation of typhoid fever by the State Department Division of Vital Statistics in 1902 has not yet been completed, so that the figures given (592) may be changed later, because where two diseases are mentioned as causing a death, as not infrequently occurs, not always the same one is used in the final compilation as in the Bulletin of Vital Statistics.

The facts exhibited in Table 1, show that while there were more outbreaks of typhoid fever in 1902 than the average for the sixteen years 1886-1901, the number of cases was less, also the numbers of cases and deaths per outbreak were less than the average numbers of cases and deaths per outbreak for the period of years, indicating that the efforts for the restriction of this disease are having their proper effect. The fact that the number of final reports received in 1902 was more than double the average number received for the sixteen years, indicates better effort on the part of local health officers in restricting typhoid fever. The fatality for 1902 was higher than the average fatality for the period of years 1886-1901.

TABLE 1.—TYPHOID FEVER.—*Exhibiting the numbers of outbreaks, localities, cases and deaths reported for the year 1902; also for the years 1886–1901 the average reported outbreaks, localities, cases and deaths, and the average cases and deaths per outbreak, the deaths per 100 cases, and the number of special final reports received.*

Year.	Outbreaks reported.	Localities reported.	Cases reported.	Deaths reported.	Average cases per outbreak.	Average deaths per outbreak.	Deaths per 100 cases.	Final reports recei'd.
1902......	878	660	2,456	596	2.77	.68	24	720
Averages 1886–1901	605	516	2,844	518	4.80	.86	18	357

Sickness-rates from reported typhoid fever in 1902.—The reporting of cases of typhoid fever is not yet as complete as the reporting of deaths from that disease, therefore any comparisons made should be subject to the mental reservation that not all cases are reported, and that the omissions are greater in some parts of the State than in others.

Table 2 shows that the sickness-rate of typhoid fever for the State in 1902, exclusive of the population and cases in Bay City, Sault Ste. Marie, Muskegon and Detroit, where only fatal cases were reported, was 99.7 per 100,000 population. The county having the greatest reported sickness-rate was Otsego with 346.8 cases per 100,000 population—over three times the average rate for the State. The lowest sickness-rate, 23.6 per 100,000 population, was in Ogemaw county. The rate in Muskegon county, which is computed exclusive of the cases and population in Muskegon city, is lower than the rate in Ogemaw county, but had the cases of sickness in Muskegon been reported this rate would probably have been higher. Schoolcraft (24.6) and Mackinac (25.5) had the next lowest rates.

Death-rates from reported typhoid fever in 1902.—The death-rates are now believed to be fairly accurate. Table 2 shows that the death-rate from reported typhoid fever in 1902, for the State, was 24.0 per 100,000 of population. The county having the highest death-rate (98.6) was Chippewa, and that having the lowest (where deaths occurred), 5.3 deaths per 100,000 population, was Dickinson.

Typhoid fever in each month of the year 1902.—The last line in Table 3 shows the number of outbreaks present in each month of the year. As many of the outbreaks lasted more than one month they are counted in each month of their duration; consequently the sum of the outbreaks present in the several months exceeds the total number of reported outbreaks.

TABLE 2.—*Numbers of cases and deaths reported from typhoid fever, and the cases and deaths per 100,000 persons living in each county in Michigan during the year 1902. (Compiled from reports of health officers, etc.)*

State and counties.	Estimated population of Michigan for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State.........	2,480,762	2,456	596	† 99.7	24.0
Alcona.......	5,781	0	0	0	0
Alger..........	7,358	6	2	81.5	27.2
Allegan	38,686	22	3	56.9	7.8
Alpena.......	18,432	19	2	103.1	10.9
Antrim	17,944	33	7	183.9	39.0
Arenac.......	10,779	6	0	55.7	0
Baraga.......	4,350	6	0	137.1	0
Barry.........	22,118	9	4	40.7	18.1
Bay...........	62,734	23	16	‡ 36.2	25.5
Benzie........	10,221	19	0	185.9	0
Berrien.......	50,339	30	11	59.6	21.9
Branch.......	28,343	14	5	49.4	17.6
Calhoun......	49,927	54	5	108.2	10.0
Cass..........	20,776	21	5	101.1	24.1
Charlevoix...	14,718	18	1	122.3	6.8
Cheboygan...	16,144	14	1	86.7	6.2
Chippewa....	23,338	27	23	‡ 85.5	98.6
Clare.........	8,486	3	0	35.4	0
Clinton.......	24,760	52	9	210.0	36.3
Crawford....	3,019	3	1	99.4	33.1
Delta.........	25,417	20	9	78.7	35.4
Dickinson	18,932	10	1	52.8	5.3
Eaton.........	31,352	48	10	153.1	31.9
Emmet.......	17,777	37	3	208.1	16.9
Genesee......	42,220	70	15	165.8	35.5
Gladwin......	7,116	12	1	168.6	14.1
Gogebic......	17,622	6	6	34.0	34.0
Gd. Traverse.	21,465	22	4	102.5	18.6
Gratiot.......	30,259	53	9	175.2	29.7
Hillsdale	29,729	35	11	117.7	37.0
Houghton....	73,353	57	11	77.7	15.0
Huron........	34,796	20	6	57.5	17.2
Ingham.......	39,860	42	10	105.4	25.0
Ionia..........	34,165	34	8	99.5	23.4
Iosco.........	9,548	4	2	41.9	20.9
Iron	10,220	13	2	127.2	19.6
Isabella.......	23,230	38	7	163.6	30.1
Jackson......	48,782	100	18	205.0	36.9
Kalamazoo...	45,060	64	7	142.0	15.5
Kalkaska.....	7,629	5	1	65.5	13.1
Kent..........	132,302	254	54	192.0	40.8
Counties.					
Keweenaw...	3,353	0	0	0	0
Lake..........	4,643	7	1	150.8	21.5
Lapeer.	27,229	23	6	84.5	22.0
Leelanau	10,882	3	0	27.6	0
Lenawee.....	48,360	76	15	157.2	31.0
Livingston....	19,406	16	2	82.4	10.3
Luce..........	3,193	3	0	94.0	0
Mackinac	7,857	2	0	25.5	0
Macomb......	33,528	23	5	68.6	14.9
Manistee.....	28,434	21	7	73.9	24.6
Marquette....	42,313	91	15	215.1	35.5
Mason.........	19,037	9	6	47.3	31.5
Mecosta......	20,681	12	6	58.0	29.0
Menominee...	28,144	50	3	177.7	10.7
Midland.......	14,845	15	3	101.0	20.2
Missaukee....	10,088	19	1	188.3	9.9
Monroe.......	32,612	30	6	92.0	18.4
Montcalm....	32,286	18	5	55.7	15.5
Montmorency	3,498	2	1	57.2	28.6
Muskegon.....	36,980	7	6	‡ 18.9	16.2
Newaygo.....	17,189	25	7	145.4	40.7
Oakland......	45,496	22	4	48.4	8.8
Oceana.......	16,658	13	4	78.0	24.0
Ogemaw......	8,473	2	0	23.6	0
Ontonagon...	5,971	17	2	284.7	33.5
Osceola	18,319	10	6	54.6	32.8
Oscoda.......	1,356	1	1	73.7	73.7
Otsego........	6,633	23	5	346.8	75.4
Ottawa.......	39,859	27	10	67.7	25.1
Presque Isle..	9,787	3	1	30.7	10.2
Roscommon..	1,829	1	0	54.7	0
Saginaw......	81,014	70	8	86.4	9.9
Sanilac	35,423	35	3	98.8	8.4
Schoolcraft..	8,141	2	0	24.6	0
Shiawassee..	34,202	33	9	96.5	26.3
St. Clair......	55,528	86	22	154.9	39.6
St. Joseph....	23,489	29	9	123.5	38.3
Tuscola	36,380	40	8	109.9	22.0
Van Buren...	34,008	58	11	170.5	32.3
Washtenaw..	49,177	45	7	91.5	14.2
Wayne.......	367,565	146	96	‡125.3	26.1
Wexford.....	17,775	18	5	101.2	28.1

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* Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

† This rate is computed exclusive of the population and cases in Bay City, Sault Ste. Marie, Muskegon and Detroit, because ten fatal cases only were reported from Bay City, seventeen fatal cases from Sault Ste. Marie, three fatal cases from Muskegon, and eighty-one fatal cases from Detroit.

‡ The case-rates in the counties of Bay, Chippewa, Muskegon and Wayne, are computed exclusive of the population and cases in Bay City, Sault Ste. Marie, Muskegon and Detroit, in their respective counties, because only fatal cases were reported from these cities.

TABLE 3.—*Exhibiting the number of outbreaks of Typhoid fever reported to have begun, to have ended, and to have been present, in each month of the year 1902, in Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began..	67	44	44	44	40	43	65	134	124	77	48	41	771
Outbreaks ended..	31	44	63	34	53	32	48	56	89	120	101	96	767
Outbreaks present	100	126	134	115	125	118	151	239	313	301	225	168	....

TABLE 4.—*Exhibiting the number and per cent of cases of typhoid fever, taken sick, and the number and per cent present in Michigan in each month during the year 1902. (Includes each case for which the time during which it existed, was stated in reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases present in any part of the month	*2,314	199	263	267	225	230	192	241	427	613	553	451	374
Per cent of cases present..........	....	8.6	11.4	11.5	9.7	9.9	8.3	10.4	18.5	26.5	23.9	19.5	16.2
Number of cases taken sick.......	†2,124	143	126	152	92	103	105	133	299	352	257	200	162
Per cent of cases taken sick.......	....	6.7	5.9	7.2	403	4.8	4.9	6.3	14.1	16.6	12.1	9.4	7.6

* There were 2,456 cases of typhoid fever reported in 1902; in 2,314 of these cases the month or months in which they were present were reported, leaving 142 cases of which this information was not stated.

† Of the 2,456 cases of typhoid fever reported in 1902, the months in which they were taken sick were reported in 2,124 instances.

The first line in Table 4 shows the number of cases present in each month of the year, and the second line shows the per cent the cases present by months were of all cases reported present in any month. There were 142 cases of which the month or months in which they were present were not reported.

The third line of the table shows the number of cases taken sick each month, and the last line shows the per cent the cases taken sick in each month were of the total number of these cases. There were 332 cases of which the months in which they were taken sick were not reported.

Source of contagium of reported typhoid fever.—Of the 2,456 reported cases of typhoid fever in 1902, the local health officers stated the source of contagium as follows:

Traced to a former case, 107; attributed to infected, contaminated, or surface water, 93; cases reported as coming from outside jurisdiction, 165; from probable outside jurisdiction, 8; attributed to unsanitary conditions, 19; contaminated food or milk supply, 2 cases; the source of contagium of which was reported as unknown, 1,620 cases; the source of contagium of which was not reported, or the statements were too indefinite for classification, 410; from flies, 10; probably from drinking water, 22; total, 2,456.

TABLE 5.—*Showing the number of deaths from typhoid fever and typhoid pneumonia in each month of the year 1902; and the per cent the deaths in each month were of all deaths from typhoid fever, and per cent the deaths in each month were of all deaths from typhoid pneumonia, the dates of which were reported to the office of the State Board of Health.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov	Dec.	Total
Deaths from typhoid fever......	42	37	36	34	33	27	33	44	75	87	63	60	571
Per cent..........	7	6	6	6	6	5	6	8	13	15	11	11	....
Deaths from typhoid pneumonia	0	2	7	0	3	0	0	0	3	1	2	4	22
Per cent..........	0	9	32	0	14	0	0	0	14	5	9	18	....

Case of typhoid fever reported recovered while still confined in bed.—Relative to a case of typhoid fever, the health officer of Wheatland township, Ingham county, writes as follows:

"There is one case of typhoid fever that I hardly know how to report. He has been sick a long time, the doctor left him a number of days ago as cured of typhoid fever but he has not yet got out of his bed, and I understand the doctor still makes occasional visits to him, so I don't report him as recovered. Am I right or not?"

Relative to this case of typhoid fever, the Secretary wrote:

"In reply to the question contained in your letter, after a person has been reported as recovered from a disease, he should not be reported as still sick with it. You should ascertain from the attending physician, what the gentleman is still sick with, when he has been reported as recovered from typhoid fever."

Relative to the disinfection of houses.—January 22, 1903, the health officer of Wheatland township again wrote to this office as follows:

"You will find the final report I send you on this typhoid outbreak very imperfect. I am sorry it is so, but don't think myself altogether at fault. I have disinfected only two houses, one of them twice, as there were two cases in the house. Two houses were unwilling to let me disinfect,—this through the influence of the attending physicians. In one case they thought disinfectants entirely unnecessary, and in the other they were informed by their doctor that they could disinfect as well as any one, and so they did not notify me (as they agreed to), when the patient was able to be out of his room, but disinfected the room by burning about a half pound of sulphur in it. The house where the patient died I cannot disinfect on account of a vote of the town board. I send you a copy of the vote. This cuts me off from disinfecting any house where the patient did not recover, neither have I a right to disinfect water closets at the town's expense; nor to use disinfectants at the town's expense through the course of a disease. In fact I can only use them at the town's expense to disinfect a house after the patient has *recovered.*

"So what can I do when my board of health and the doctors are working against me? Some of the board think the health laws are pretty strict and it is pretty hard to live up to them, and if a house is disinfected it don't matter who does it. If things are to continue long in this way I think I will resign my office."

January 23, 1903, the Secretary of the Board wrote to N. F. Cole, clerk of Wheatland township, as follows:

"I have a transcript, evidently of a motion made and carried by your local board of health, in which your board has instructed your health officer to disinfect only when a patient has *recovered* from some contagious disease.

"The motion is absurd, and your board ought to be sufficiently ashamed of it to 'wipe it off the slate.' I would like to ask your board if you do not think it just as essential to disinfect an infected house after a patient has *died*, as after the patient has recovered. This Board thinks it is, and so recommends in its publications.

"Herewith I send to you a copy of the publication of this Board relative to the restriction and prevention of typhoid fever. I hope your Board will meet and rescind any such action as it is alleged to have taken as stated above."

January 27, 1903, Mr. Cole wrote to the Secretary of the State Board of Health as follows:

"In reply to yours of the 23rd. I send you a true copy of the action of the township board in regard to the use of disinfectants:

"'Moved and carried that the Health Officer be instructed not to run the township in debt for any disinfectants, or secure any at the township's expense other than what is necessary to disinfect the houses after the patient is recovered from some contagious disease.'

"I wish to say that it was not the intention of the board to stop the disinfecting of a house after the death of the patient, but it was simply to stop the distribution of disinfectants where they are not properly used, or not used at all, and therefore are of no value. I admit that the motion as it is, is not quite clear as to the intention of the board and should be amended."

Probable movement of infection of reported typhoid fever.—In eight outbreaks, with an aggregate of thirteen cases, including four deaths, the contagium was reported as probably traced to other outbreaks. Three outbreaks, with seven cases, including one death, were reported as probably traced to three localities outside the State.

In addition to the probable movement of contagium as given above, the reported movements of contagium of typhoid fever in Michigan are given in tabulated form in Table 6.

Measures taken to restrict typhoid fever,—results.—In studying the effects of efforts of health officers for the restriction and prevention of typhoid fever, and of the difficulties experienced by some of them in carrying out the methods recommended by the State Board of Health to that end. it is interesting to note the difference in the reported number of cases of sickness and of deaths from this disease, in outbreaks where local health officers were able to enforce isolation and disinfection, and in those outbreaks in which, for any reason, those restrictive measures were neglected.

By Table 7 it may be seen that in the outbreaks relative to which the reports state that isolation and disinfection were enforced, there occurred 1.48 cases, including .26 of one death per outbreak; whereas, in those outbreaks in which isolation and disinfection were neglected there were 2.67 cases, including .65 of one death per outbreak.

An examination of Table 7 shows that there were 292 outbreaks where isolation and disinfection were doubtful, and that the number of cases to the outbreak was greater than in those outbreaks where isolation and disinfection were enforced.

In the compilation of the reports for Tables 7 and 8 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs,

TABLE 6.—*First, second and third localities, where the second locality was infected with typhoid fever from the first, and the third was infected from the second; and the number of cases and deaths from typhoid fever in the first, second and third localities with the dates of the beginning and ending of each outbreak, in 1902. (Compiled from reports of health officers who were able to trace the source of the contagium to other localities.)*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Antrim county: Elk Rapids village..... (Jan. 1-Dec. 28.)	18	1	Antrim county: Central Lake village... (Feb 7-Mar. 7)	1	0			
Antrim county: Kearney township.....	*	....	Antrim county: Bellaire village........ (Oct. 24-Dec. 23.)	3	0	Charlevoix county: Hayes township..... (Dec. 18-Jan. 16, '03)	1	0
Bay county: Bay City................ (Jan.-Dec. 28.)	10	10	Wayne county: Northville village...... (Sept. 7-Oct. 12.)	1	0			
Branch county: Bronson (village)†..... (June 18-July 20.)	2	0	Branch county: Noble township........ (Oct. 6-Dec. 31.)	4	1			
Calhoun county: Albion city............. (Jan. 25-Dec.)	12	0	Eaton county: Charlotte city.........	1	0			
Calhoun county: Battle Creek city...... (Aug. 16-Oct.)	13	2	Barry county: Carlton township...... (Sept. 25-Oct. 20.)	1	0			
			Calhoun county: Albion city.............	1	0			
Calhoun county: Battle Creek city...... (Jan. 18-May 31.)	4	0	Van Buren county: Hartford village....... (Mar. 10-Oct. 15)	6	1			
Calhoun county: Clarendon (township)† (Aug. 2-Sept. 4.)	2	0	Calhoun county: Eckford township..... (Sept. 3-Oct. 10.)	1	0			
Calhoun county: Marshall city...........	3	0	Calhoun county; Battle Creek township	1	0			
Calhoun county: Pennfield township....	*	0	Calhoun county: Burlington township... (Nov. 26-Jan. 13, 1903.)	1	0			
Calhoun county..........	....	....	Van Buren county: South Haven city...... (May 15-May 31.)	1	0			
Charlevoix county: Peaine township....... (Beaver Island.)	*	....	Charlevoix county: Charlevoix village..... (July 26-Sep. 30.)	1	0			
Chippewa county: Sault. Ste. Marie city. (Jan.-Nov.)	17	17	Manistee county: Manistee city.......... (Aug. 17-Sep. 5.)	1	0			
			Marquette county: Marquette city........ (Dec. 6-Feb. 14, 1903.)	8	3			
			Richmond township.... (Aug. 7-Aug. 30.)	1	0			
Clinton county: Maple Rapids village.. (Aug. ——.)	1	0	Clinton county: Greenbush township.. (Aug. 4-Sep. 24.)	2	0			

*** Typhoid fever was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.**

† Health officer of second locality did not state whether it was from village or township.

TABLE 6.—*Continued.—Movement of infection of typhoid fever in 1902.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Clinton county: St. Johns village....... (July-Sept.)	21	3	Clinton county: Greenbush township... (July 24-Aug. 12.)	1	0			
Delta county: Escanaba city......... (May 8-May 22.)	1	1	Schoolcraft county: Germfask township.... (July 10-Aug. 15.)	1	0			
Delta county: Wells township........	*	....	Delta county: Escanaba city.......... (Aug. 22-Sep. 14.)	1	1			
Dickinson county: Norway township.....	*	....	Ontonagon county: Rockland township.... (May 28-July 10.)	1	0			
Eaton county: Eaton Rapids township (Sept. 18-Nov. 21.)	4	0	Eaton County: Benton township...... (Oct. 25-Nov. 19.)	1	0			
Emmet county: Bear Creek township.. (Jan. 20-Jan. 27.)	1	1	Washtenaw county: Ann Arbor city........ (—— Aug. 31.)	1	1			
Genesee county: Atlas township........	*	....	Oakland county: Ortonville village...... (Oct. 22-Dec. 11.)	1	1			
Genesee county: Flint city............... (Jan. 1-Jan. 30, 1903.)	36	7	Genesee county: Gaines township....... (Sept. 15-Nov. 1.),	1	0			
Genesee county: Flushing township..... (Aug 1-Nov. 10.)	3	1	Genesee county: Flushing village........ (Oct. 27-Nov. 27.)	1	0	Lapeer county: Otter Lake village.. (Nov. 15-Dec. 31.)	1	0
Grand Traverse county: Whitewater township. (May 18-Aug. 11.)	7	0	Antrim county: Bellaire village......... (Aug. 15-Sept. 13.)	1	1			
Gratiot county: Alma village........... (Feb. 23-Dec. 31.)	25	1	Isabella county: Coldwater township... (Dec.-Dec. 12.)	1	1			
Gratiot county: Ithaca village..........	*	....	Gratiot county: Arcada township...... (Jan. 30-July 21.)	3	0			
Gratiot county: Lafayette township...	*	....	Gratiot county: North Star township.. (Aug. 25-Nov. 23.)	10	1			
Hillsdale county: Hillsdale city.......... (July 25-Dec. 2.)	6	1	Hillsdale county: Cambria township..... (Dec. 14-Jan. 25, 1903.)	1	0			
Houghton county: Calumet township..... (Jan. 1-Dec. 31.)	19	3	Ontonagon county: Greenland township... (Sept. 21-Oct. 20.) Rockland township.... (July 4 ——.)	1 1	0 0			
Houghton county: Hancock village....... (—— Oct. 21.)	1	1	Ontonagon county: Ontonagon village..... (Sept. 15-Nov. 12.)	2	1			
Huron county: Gore township......... (Port Hope.)	*	....	Mecosta county: Big Rapids city......... (—— Nov. 1.)	2	2	Manistee county: Manistee city†...... (Aug. 10-Sept. 5.)	1	0

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* This foot-note is on the bottom of the first page of this table.

† From Manistee City the infection spread to Copemish Vil., Marquette Co., resulting in one case.

TABLE 6.—*Continued.—Movement of infection of typhoid fever in 1902.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Huron county: **Winsor township......** **(Feb. 15-Mar. 22.)**	1	0	Huron county: Grant township........ (Nov. 5 Dec. 10.)	2	0			
Ingham county: **Lansing city...........** **(Aug. 1-Jan. 7, 1903.)**	10	4	Eaton county: Delta township........ (Dec. 10-Feb. 7, 1903.)	1	0			
Ingham county: **Leslie village...........** **(Nov. 4 Dec. 6.)**	1	0	Ingham county: Mason city............. (Nov. 10-Dec. 18.)	1	1			
Ingham county: **Meridian township.....** **(Oct. 15-Nov. 5.)**	1	1	Lapeer county: Imlay City village..... (Sept. 4-Oct. 10.)	2	0			
Ionia county: **Belding city............** **(Aug. 13-Dec. 25.)**	4	0	Gratiot county: Arcada township...... (Nov. 20-Dec. 16.)	1	0			
Isabella county: **Vernon township......** **(Aug. 5-Oct. 9)**	4	1	Clare county: Clare city.............. (June 20*-July 20.)	1	0			
Jackson county: **Jackson city............** **(Jan. 1-Dec. 31.)**	59	11	Ingham county: Mason city............. (Dec. 25-Jan. 14,1903)	1	0			
Kalamazoo county: **Kalamazoo city. ......** **(Jan. 11-Dec. 31.)**	48	5	Allegan county: Watson township...... (Nov. 28 ——.)	1	0			
			St. Joseph county: Mendon village........ (July 19-Sept. 15.)	1	0			
Kalamazoo county: **Wakeshma township..** **(Mar. 3-Mar. 22.)**	1	0	St Joseph county: Nottawa township.... (June 24-Oct. 6.)	2	2			
Kalkaska county: **Clearwater township..**	†	....	Newaygo county: Newaygo village...... (Mar. 20-May 26.)	3	1			
Kalkaska county: **Garfield township......**	†	....	Kalkaska county: Boardman township... (Oct. 16 ——.)	1	0			
Kalkaska county: **Orange township......** **(—— Nov. 10)**	1	1	Kalkaska county: Rapid River township.. (Oct. 19-Nov. 14.)	1	0			
			Missaukee county: Norwich township..... (Oct.-Nov.)	2	0	**Missaukee county:** **Caldwell township..** **(Sept. 11‡-Oct. 17.)**	2	0
Kalkaska county.........	....	....	**Antrim county:** **Milton township........** **(Oct. 22-Jan. 24, 1903.)**	2	0			
			Oceana county: Newfield township.... (Nov. 20-Dec.)	1	0			
Kent county: Algoma township......	†	....	Kent county: Sparta village.......... (Dec. 18-Jan. 31, 1903.)	1	0			

*** Alleged cause,—"Drinking water in Vernon township."**
† This foot-note is on the bottom of the first page of this table.
‡ "Bad water in lumber camp in Norwich Tp." the reported infection.

TABLE 6.—*Continued.—Movement of infection of typhoid fever in 1902.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Kent county: Grand Rapids city..... (Jan. 1-Dec. 31.)	210	46	Allegan county: Wayland township.... (Feb. 1-Mar 20.)	6	0			
			Barry county: Middleville village..... (Jan. 20-Feb. 23.)	1	0			
			Hillsdale county: Pittsford township.... (Jan. 11-Feb. 2.)	1	0	Hillsdale county: Wheatland towns'p (Mar. ——.)	1	0
			Ionia county: Belding city............. (Mar. 14-Apr. 12.)	1	1	Clinton county: Fowler village...... (Aug. 1-Aug. 20.)	2	1
			Ionia city.,.............. (Mar. 4 May 19.)	1	0	Ionia county: Ronald township.....	2	0
			Kalamazoo county: Ross township.......... (Sept. 5-Oct. 17.)	1	0			
			Kent county: Caledonia township.... (Jan. 1-Jan. 28.)	2	1			
			Caledonia township.... (Aug. 22-Oct. 1.)	1	0			
			Rockford village....... (Dec. 27-Feb. 16, 1903.)	2	0			
			Newaygo county: Ensley township....... (Feb. 18-Mar. 1.)	1	0			
			White Cloud village... (Oct.-Jan. 30, 1903.)	1	0			
			Wilcox township...... (Sept. 15-Oct. 7.)	1	1			
			Ottawa county: Spring Lake township (Aug. 1-Aug. 30.)	1	1			
Kent county: Nelson township.......	*	....	Kent county: Sand Lake village..... (July 9-Aug. 15.)	1	1			
Lenawee county: Adrian city............ (May 4-Sept. 13.)	5	3	Lenawee county: Blissfield township..... (Aug. 12-Jan. 15, 1903.)	5	0			
Lenawee county: Britton village......... (Sept. 15 Dec. 28.)	5	0	Lenawee county: Deerfield village....... (Sept. 17-Oct. 7.)	1	0			
Lenawee county: Clinton village†........ (Sept. 23-Jan. 30, '03.)	3	1	Lenawee county: Tecumseh village...... (July 24‡-Nov. 12)	6	1	Lenawee county: Rollin township..... (Aug. 10-Oct. 12.)	1	0
Lenawee county: Hudson city............	*	....	Hillsdale county: Pittsford township.... (Oct. 20-Nov. 20.)	1	0			
Livingston county: Fowlerville village....	*	....	Ingham county: Stockbridge township. (Oct. 10-Dec. 31.)	3	0			
			Kalamazoo county: Charleston township.. (Aug. 30-Oct. 3.)	1	0			

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* This foot-note is printed at the bottom of the first page of this table.

† Health officer of second locality did not report whether it was village or township.

‡ The source of infection of the outbreak in Clinton village was reported, "Believe from their drinking water." Probably the infection was there at the time of the reported outbreak in Tecumseh village.

TABLE 6.—*Continued.—Movement of infection of typhoid fever in 1902.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Lower Peninsula	....	....	Mackinac county: Garfield township (June-Aug.)	1	0			
Macomb county: Mt. Clemens city (— Dec. 4.)	3	3	Genesee county: Flushing village (Oct. 6-Nov. 6.)	1	0			
Macomb county: New Haven village	*	....	Wayne county: Hamtramck village (Sept. 7-Jan. 22, 1903.)	6	1			
Manistee county: Bear Lake (village)† (June 26-July 7.)	1	1	Benzie county: Weldon township (July 2-Aug. 6.)	1	0			
Marquette county: Negaunee city (Apr. 1-Dec. 31.)	67	10	Marquette county: Ishpeming city (Sept. 20-Nov.)	1	0			
			Washtenaw county: Ann Arbor city (Sept. 19-Nov.)	1	0			
Mason county	....	....	Newaygo county: Lincoln township (Aug. 19-Dec. 3.)	2	1			
Menominee county: Menominee city (Jan. 1-Dec. 31.)	41	3	Menominee county. Spaulding township (Jan. 30-May 24.)	6	0	Delta county: Escanaba city (May 8-May 22.)	1	1
Montcalm county: Crystal township (Jan. 9-Jan. 20,)	1	1	Montcalm county: Carson City village (May 25-July 29.)	5	0			
			Ferris township (May 31-July 11.)	1	0			
Missaukee county: McBain village (July 12-Nov. 17.)	8	0	Wexford county: Manton village (Sept. 26-Nov. 15.)	1	0			
Newaygo county: White Cloud village (Jan. 1-Mar. 30.)	4	0	Benzie county: Weldon township (July 2-Aug. 3.)	1	0			
			Kent county: Lowell village (Aug. 22-Sept. 19.)	2	0			
Northern Michigan	....	....	Montcalm county: Ferris township (Oct. 18-Oct. 25.)	1	1			
			Van Buren county: Porter township (Oct. 1-Oct. 21.)	1	1			
Oceana county: Hart	*	....	Oceana county: Crystal township (Sept.-Nov. 26.)	5	2			
Ontonagon county: Greenland township (Jan. 1-Feb. 17.)	2	0	Ontonagon county: Ontonagon village (Mar. 1-Mar. 21.)	1	1			
Osceola county: Hartwich township	*	....	Osceola county: Middle Branch towns'p (Sept. 16-Oct. 26.)	1	1			

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* This foot-note is on the bottom of the first page of this table.

† Health officer of second locality did not state whether it was from village or township.

TABLE 6.—CONTINUED.—*Movement of infection of typhoid fever in 1902.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Otsego county: Gaylord village........ (July 4-Apr. 5, 1903.)	16	5	Otsego county: Corwith township..... (Dec. 6-Jan. 1, 1903.)	1	0			
Presque Isle county: Onaway village........ (Sept.-Nov. 6.)	2	0	Cheboygan county: Forest township....... (Sept.-Oct. 5.)	1	1			
Saginaw county: Birch Run township...	*	....	Genesee county: Vienna township...... (Aug. 28-Oct. 11.)	2	1			
Sanilac county: Sanilac Center village (Aug. 26-Dec. 15.)	7	0	Sanilac county: Bridgehampton tow'p. (Apr. 16†-May 28.)	3	0			
South part of State.....	....	....	Kalkaska county: Springfield township.. (Jan.-Feb. 20.)	1	0			
St. Clair county: Port Huron city........ (Feb. 8-Nov. 17.)	47	11	Clinton county: Elsie village............ (May 7.-July 12.)	4	0			
			Huron county: Fair Haven township.. (Feb. 22-Apr.)	2	0			
			Tuscola county: Novesta township..... (Sept. 14-Oct.)	1	1			
St. Joseph county: Leonidas township.... (Aug. 1-Dec. 21.)	6	1	St. Joseph county: Nottawa township.... (Sept. 27-Oct. 20.)	1	1			
Tuscola county: Arbela township.......	*	....	Tuscola county: Vassar township....... (Dec. 20-Jan. 23, 1903.)	3	0			
Washtenaw county: Chelsea village.........	1	0	Wayne county: Wayne village......... (Dec. 12-Jan. 7, 1903.)	1	0			
Washtenaw county: Ypsilanti city.......... (Aug. 21.-Oct. 16.)....	2	0	Washtenaw county: Ann Arbor city........ (Sept.-Oct.)	1	0			
Wayne county: Detroit.................. (Jan. 1.-Dec. 31.)	81	81	Eaton county: Chester township...... (Sept. 8-Dec. 8.)	4	0			
			Genesee county: Fenton village......... (May 9-July 25.)	2	0			
			Flushing township..... (Dec. 9-Apr., 1903.)	4	0			
			Huron county: Paris township......... (Sept. 20 Oct. 3.)	3	1			
			Oakland county: Highland township.... (Sept. 16-Oct. 29.)	1	0			
			Independence town'p. (Aug 12-Oct. 10.)	1	0			

*** This foot-note is on the bottom of the first page of this table.**

† The source of infection of the outbreak in Sanilac Center village was reported to be from the drinking water. Probably the infection was there at the time of the reported outbreak in Bridgehampton Township.

TABLE 6.—CONTINUED.—*Movement of infection of typhoid fever in 1902.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Wayne county—con.: Detroit	....	....	Washtenaw county: Dexter village (Sept. 9-Sept. 18.)	1	1			
Wayne county: Trenton village (Mar. 20-May 5.)	2	0	Wayne county; Monguagon township (May 18-July 1.)	1	0			
Wayne county: Wyandotte city (Jan.-May.)	6	3	Monroe county: Berlin township (July 1-Sept.)	2	0			
			Washtenaw county: Ypsilanti city (Aug. 10-Sept. 13.)	1	0			
Wayne county: Wyandotte city (Sept. 10-Nov. 25.)	5	1	Monroe county: Summerfield town'p (— Oct. 21.)	1	1			
			Wayne county: Brownstown township (Oct. 2-Oct. 31.)	1	1			
			Fenton village (Dec. 8. —.)	2	1			
Wexford county: Cadillac city (Mar.-Mar. 27.)	2	1	Lake county: Chase township (June 30-Aug 17.)	1	0			
Wexford county	....	....	Lake county: Luther village (Aug. 10-Dec. 24.)	1	1			
Movement of infection of typhoid fever into Michigan from outside the State.								
Alabama: Birmingham	....	....	Cass county: Cassopolis village (June 3-July 25.)	1	0			
Colorado: Denver	....	....	Kent county: Sparta village (Jan. 25-Feb. 17.)	1	0			
Colorado: Lajunta	....	....	Cass county: Cassopolis village (June 5-July 1.)	1	0			
Florida: Palm Beach	....	....	St. Joseph county: Florence township (July 10-Aug. 20.)	1	0			
Florida	....	....	Genesee county: Fenton village (Mar. 31-Apr. 31)	1	0			
Illinois: Chicago	....	....	Berrien county: Buchanan township (Aug. 15-Sept. 24.)	1	0			
			Watervleit village (Aug. 26-Sept. 15.)	1	0			
			Calhoun county: Albion city (July 26-Aug 3.)	1	0			
			Tekonsha township (July 3-Sept. 18.)....	1	0			

TABLE 6.—CONTINUED.—*Movement of infection of typhoid fever* into *Michigan from outside the State.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Illinois: Chicago—concluded...	....	....	Cass county: Cassopolis village...... (July 2-Sept. 1.)	4	0			
			Clinton county: Victor township....... (Apr. 24-Oct. 14.)	1	0			
			Iron county: Iron River village...... (Oct. 26-Dec.)	1	0			
			Kalamazoo county: Prairie Ronde town'p.. (July 28-Sept. 1.)	1	0			
			Van Buren county: Lawrence township... (— Sept. 9.)	1	1	Van Buren county: Gobleville village... (Aug. 28-Oct. 29.)	2	0
			South Haven city...... (June 16-Dec. 31.)	13	0	Cass county: Calvin township.... (Nov. 11-Nov. 28.)	1	1
						Van Buren county: Gobleville village... (July 8-Oct. 14.)	2	1
Illinois: Evanston...............	....	....	Berrien county: New Buffalo village.... (Jan. 30-Mar.)	1	0			
Indiana: Granger...............	....	....	Cass county: Porter township....... (July 25-Aug. 20.)	1	0			
Indiana; Huntington............	....	....	Hillsdale county: Reading village........ (Aug. 20-Sept. 23.)	1	0			
Indiana: Michigan City.........	....	....	Berrien county: New Buffalo village... (Jan. 10-Mar. 15.)	1	0			
			Weesaw township..... (Feb. 20-Mar. 8.)	1	1			
Indiana: South Bend...........	....	....	Cass county: Penn township......... (July 13-Aug. 6.)	1	0			
Indiana..................	....	....	Kalamazoo county: Wakeshma township.. (Oct. 7-Nov. 6.)	1	0			
			Osceola county: Lincoln township...... (Oct. 25-Nov. 11.)	1	0			
Louisiana................	....	....	Washtenaw county: Ann Arbor city........ (Sept. 8-Oct.)	1	0			
Maryland.................	....	....	Manistee county: Brown township....... (Dec. 6.-Feb. 22, 1903.)	5	1			
Minnesota: Duluth..................	....	....	Missaukee county: Norwich township..... (Dec. 23-Jan. 27, 1903.)	1	0			
Mississippi: Corinth.................	....	....	Montcalm county: Greenville city......... (Nov. 26-Dec. 19.)	1	0			

TABLE 6.—CONTINUED.—*Movement of infection of typhoid fever* **into** *Michigan from outside the State.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Mississippi	....	...	Washtenaw county: Manchester township (June 24-July 10.)	1	0			
North Carolina	....	....	Huron county: Port Austin village (Nov. 10-Dec. 6.)	1	0			
Ohio: Columbus	....	....	Cheboygan county: Tuscarora township (July 2-July 25.)	1	0			
Ohio: Put in Bay Island	...	....	Isabella county: Denver township (Aug. 9-Nov. 30.)	4	0			
Ohio: Toledo	....	....	Lenawee county: Dover township (Sept. 1-Sept. 23.)	1	0			
			Monroe county: Monroe city (Mar. 22-May 14.)	1	0			
Ohio: Zanesville	....	....	Charlevoix county: Charlevoix village (July 26-Sept. 13.)	1	0			
Ohio	....	....	Eaton county: Eaton Rapids town'p (Nov. 12-Nov. 28.)	1	1			
			Mason county: Sherman township (Oct. 11-Dec. 25.)	3	1			
			Monroe county: Erie township (Sept. 16-Oct. 21.)		0			
			Ida township (Oct. 1-Oct. 18.)		0			
			Saginaw county: Brady township (Apr. 18-May 30.)		0			
South Dakota	....	....	Gogebic county: Wakefield township (Oct. 1-Oct. 25.)		1			
Tennessee: Memphis	....	....	Benzie county: Thompsonville village (Oct. 10-Dec. 26.)		0			
Wisconsin: Florence	....	....	Dickinson county: Iron Mountain city (Sept. 20-Oct. 31.)		0			
			Iron county: Iron River village (Oct. 26-Nov. 22.)		1			
Wisconsin: Marinette	....	....	Marquette county: Ishpeming city (Feb. 10-Oct.)	8	0			
Wisconsin: Milwaukee	....	....	Charlevoix county: Charlevoix village (July 30-Sept. 27.)		0			
Wisconsin: Niagara	....	....	Dickinson county: Norway city (Dec. 23-Jan. 1903.)	6	0			
Wisconsin	....	....	Calhoun county: Homer township (Feb. 14-Feb. 23.)		1			

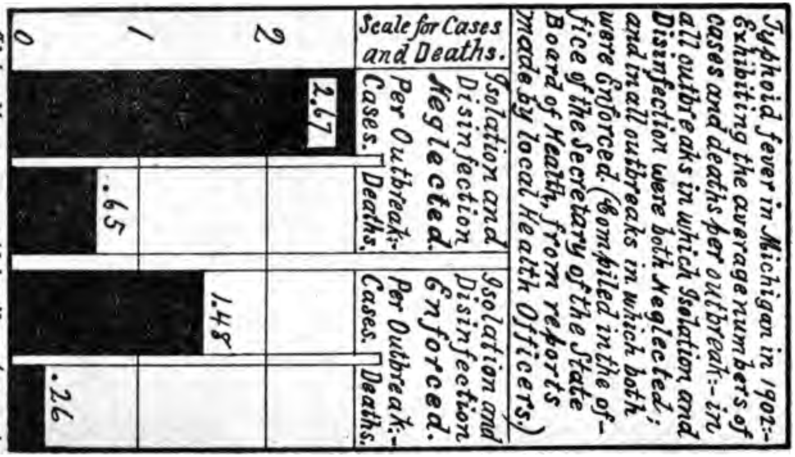
TABLE 7.—TYPHOID FEVER IN MICHIGAN IN 1902.—*Exhibiting the numbers and average numbers of cases and deaths per outbreak—(1) in all the 840 outbreaks reported; (2) in the 292 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 11 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 62 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 114 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 15 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 140 outbreaks in which both isolation and disinfection were neglected; (8) in the 208 outbreaks in which both isolation and disinfection were enforced.*

	(1) All outbreaks. (840 outbreaks.*)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (292 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (11 outbreaks.)		(4) Isolation enforced—disinfection doubtful. (62 outbreaks.)		(5) Disinfection enforced—isolation neglected. (114 outbreaks.)		(6) Isolation enforced—disinfection neglected. (15 outbreaks.)		(7) Isolation and disinfection both neglected. (140 outbreaks.)		(8) Isolation and disinfection both enforced. (208 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	1,826	398	756	184	47	7	98	15	228	39	16	8	373	91	308	54
Averages	2.17	.47	2.59	.63	4.27	.64	1.58	.24	2.00	.34	1.07	.53	2.67	.65	1.48	.26

*These do not include the cases and deaths in Detroit, Grand Rapids, Kalamazoo, Bay City, West Bay City and Calumet township, because of the difficulty in determining the beginning and ending of an outbreak in these localities, in which the disease was present in some part of the locality nearly all the time.

The figures in the last four columns in the last line of Table 7 are graphically represented in the diagram on this same page.

ISOLATION AND DISINFECTION RESTR CT TYPHOID FEVER.



Typhoid fever in Michigan in 1902:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were Enforced. (Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

This diagram graphically represents the lower line of figures in the last four columns of table 7.

[PLATE 1200.]

TABLE 8.—TYPHOID FEVER IN MICHIGAN.—*Exhibiting for the year 1902, and for the twelve year period, 1890–1901, the numbers of reported outbreaks, cases and deaths in all outbreaks and the numbers of outbreaks, cases and deaths for the same year and period of years, relative to which restrictive measures were neglected, and the numbers relative to which those measures were enforced; also the estimated numbers of cases and deaths prevented, in said year and period of years, by isolation and disinfection.*

Years.	All outbreaks.			Isolation and disinfection both neglected.			Isolation and disinfection both enforced.			Cases and deaths indicated as having been prevented by isolation and disinfection.	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1902	*840	1,826	398	140	373	91	208	308	54	417	148
Totals 1890-1901	8,098	31,371	5,486	1,239	7,287	1,095	1,141	2,228	397	17,294	1,678
Averages 12 years, 1890 1901	675	2,614	457	103	607	91	95	186	33	1,441	140
Average cases and deaths per outbreak, 11 years, 1890-1901	....	3 87	.68	....	5.61	.84	....	1.95	.35	....	....

*See foot-note to Table 7.

TABLE 16.—*Exhibiting the number of inches of earth above the ground water in Lansing, by months, for the year 1902, compared with the per cent of reported cases and outbreaks of typhoid fever in Michigan, for each month of 1902; also average per cents of the same for the 10 years, 1892–1901, and the total numbers of cases and outbreaks included in this table. Compiled from those cases of which the date of occurrence was given; and for those outbreaks of which the time of beginning was stated.*

Specifications relative to ground water and typhoid fever.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	No of cases and outbreaks included in this table.
Inches of earth above the water, year 1902	312	320	*324	320	317	315	310	308	304	307	305	306	305	....
Per cent of cases of typhoid fever reported, year 1902	100	7	6	7	4	5	5	6	14	17	12	9	8	2,124
Per cent of outbreaks which began in each month, 1902	100	9	6	6	6	5	6	8	17	16	10	6	5	771
Inches of earth above the water, average 1892-1901	310	313	313	311	310	308	305	306	308	312	312	314	313	....
Per cent of cases of typhoid fever reported, average 1892 1901	100	4	4	4	4	4	5	8	13	23	23	20	12	31,257
Per cent of outbreaks which began in each month, av. 1892-1901	100	6	3	3	3	3	6	9	17	20	16	8	6	6,478

*The well was dry.

quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

For the year 1902, better effort has been made to restrict this disease, as is shown by the fact that in twenty-five per cent of the outbreaks isolation and disinfection were enforced, while for the period of twelve years, 1890-1901, in only fourteen per cent of the outbreaks were restrictive measures enforced.

Table 8 indicates that in 1902 there was a saving of 417 cases, including 148 lives, through isolation and disinfection.

In the twelve years, 1890-1901, in those outbreaks in which isolation and disinfection were neglected, the average number of cases per outbreak was 5.61, and the average number of deaths .84 of one death; and in those outbreaks, in this period of years, in which restrictive measures were enforced, the average number of cases per outbreak was 1.96, and the average number of deaths per outbreak was .35 of one death.

Duration and average duration of sickness from reported typhoid fever.—Of the 1,900 males and 1,370 females who were reported to have died from typhoid fever within the fifteen years, 1887-1901, and of which the interval between the day of being taken sick and the day of death was given, 21 per cent of males and 24 per cent of females died before the eleventh day of sickness; 17 per cent of males and 22 per cent of females died after eleven to fifteen days of sickness. Seventy per cent of males and 72 per cent of females died before the twenty-sixth day of sickness.

The average duration of fatal cases of typhoid fever in 1902, was in males 21.7 days, and in females 20.8 days.

TABLE 9.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from typhoid fever in Michigan, during the year 1902, and averages for the 15 years, 1887-1901. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of typhoid fever.															
Year.	Sex.	Average duration.	No. of cases included.	Duration of sickness:—Per cent of deaths in each period of days.											
				All cases	Under 11 days.	11 to 15.	16 to 20.	21 to 25.	26 to 30	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1902.	Males.....	21.7	201	100	18	22	12	15	13	4	4	4	1	1	2
	Females..	20.8	145	100	21	19	23	10	11	3	5	5	1	2	2
Av. 1887-1901.	Males.....	......	127	100	21	17	17	15	10	5	4	3	3	1	3
	Females..	......	91	100	24	22	14	12	10	6	4	4	1	1	3

In Table 10 it may be noticed that in *non-fatal* cases of typhoid fever, for the fifteen years, 1887-1901, sixty-three per cent of the males and sixty-four per cent of the females recovered before the thirty-sixth day of sickness. The average duration of non-fatal cases in 1902 was 48.7 days for males, and 31.5 days for females.

TABLE 10.—*Exhibiting, by sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of non-fatal cases of sickness from typhoid fever, in Michigan, during the year 1902, and the averages for the 15 years, 1887--1901. Compiled from those reports which stated the length of time the patient was sick.*

Non-fatal cases of typhoid fever.															
Year.	Sex.	Average duration.	No. of cases included.	Duration of sickness:—Per cent of cases in each period of days.											
				All periods.	Under 11 days.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1902.	Males.....	48.7	645	100	3	7	9	14	27	11	9	6	4	3	8
	Females..	31.5	533	100	2	6	9	14	29	14	7	6	5	3	6
Av. 1887–1901.	Males.....	......	467	100	2	6	8	15	18	14	11	8	6	3	9
	Females..	......	351	100	2	6	9	16	17	14	12	7	4	4	9

Ages of fatal and non-fatal cases of reported typhoid fever.—Table 11 shows that of the 1,042 males and 859 females who were sick with typhoid fever in 1902, and of whom the ages were reported, the greatest per cent of males were of ages between twenty and twenty-four years; and of females (in any five year period) was between fifteen and nineteen years.

Table 12 shows that of the 329 males and 248 females who died of typhoid fever in 1902, and of whom the ages were reported, the greatest per cent of males were aged from twenty to twenty-four years; and the greatest per cent of females were between fifteen and nineteen years old; and that 62 per cent of the males and 65 per cent of the females were under thirty years of age.

Table 12 shows also that the greatest per cent of decedents of both sexes in the ten years, 1892-1901, died at ages between twenty and twenty-four years.

In studying Tables 11 and 12, and first two lines in Table 13, relative to age of persons who died with or who had typhoid fever, it should be held in mind that there are more persons living in the earlier ages than at the more advanced ages. In the last three lines of Table 13, this fact is taken account of, and they exhibit the relative danger of death at each period of life, according to the experience in Michigan in the ten years, 1892-1901.

The average age of fatal and non-fatal cases.—The average age of decedents for the year 1902 was 28.1 years for males and 28.4 years for females, and for the period of years 1892-1901, was 28.0 for males and 25.7 for females, and for both sexes 27.1 years. The average age of cases recovering from this disease, for the year 1902, was 24.6 years for males and 23.9 years for females, and for the period of years 1892-1901, the average age was 23 years for males and 22 years for females.

TABLE 11.—*Exhibiting, by sex, the per cent of persons in certain age-groups sick from typhoid fever in Michigan, during the year 1902, and the average for the 15 years, 1887–1901; also the average age and the number of cases included. Compiled from such reports as stated the ages.*

Year.	Sex.	Average age of persons sick, years.	No. of cases included.	Age.—In periods of years.—Per cent of cases in each period of age.										
				All ages.	Under 10 years	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males.......	24.6	1,042	100	14	10	16	17	13	10	6	4	4	6
	Females....	23.9	859	100	16	13	19	15	9	6	6	5	3	9
Av. 1887–1901.	Males.......	23	869	100	15	12	15	20	20	8	6	4	3	4
	Females....	22	654	100	18	17	19	14	9	7	5	4	3	5

TABLE 12.—*Exhibiting, by sex, the per cent of persons in certain age-groups who died from typhoid fever, in Michigan in 1902, and during the 10 years, 1892–1901, also the average age and the number of deaths included. Compiled from such reports as stated the ages.*

Year.	Sex.	Average age of decedents, years.	No. of deaths included.	Per cent in certain age-groups.*										
				All ages.	Under 10 years	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males.......	28.1	329	100	13	5	14	16	14	11	5	5	6	11
	Females....	28.4	248	100	13	9	19	16	8	4	6	6	3	17
1892–1901.	Males.......	28.0	2,406	100	8	8	12	19	15	11	9	5	5	10
	Females....	25.7	1,668	100	11	13	18	15	9	8	7	5	4	11
	Both sexes.	27.1	4,074	100	9	10	15	17	13	9	8	5	4	10

*In each age-group both years are included.

By Table 13 it may be seen, that of males the greatest death-rates from typhoid fever were in the age-periods fifteen to thirty-five years, especially in the period twenty to twenty-four years; the greatest death-rate of females was during the age-period fifteen to twenty-five years.

Two lines of evidence of the prevalence of typhoid fever.—In studying the prevalence of typhoid fever in 1902, from the facts presented in the preceding and following pages, it must be borne in mind that those facts are derived from two distinct sources of information:

1.—The numbers of outbreaks, of cases of sickness, and of deaths from typhoid fever are taken from special reports from health officers, during the course of an outbreak, at its close, or in annual reports at the close of the year. If all the people and officers reported as the law provides, the facts presented would represent the *actual numbers* of outbreaks, cases of sickness, and deaths from typhoid fever which occurred in the State during the year; but *all* do not so report. It is just, however, to state that as the people generally are becoming better instructed in the measures recommended by the State Board of Health for the saving of life and health, better and more complete reports are made year by year. So, each year, we believe that an increasing proportion of the cases of sickness and deaths from the dangerous communicable diseases are reported to this office. This tends toward an apparent increase in the prevalence of the disease each year, modified, of course, by the real fluctuation in prevalence. While waiting for perfect reports, the facts derived from those now received are valuable for purposes of study.

TABLE 13.—*Exhibiting, by sex, the* **number** *of persons in certain age-groups who died of typhoid fever during the year 1902; also by age-groups, the number of deaths in the ten years, 1892--1901, per 100,000 inhabitants.*

Year.	Sex.	Average age of decedents, years.	No. of deaths included.	Number of deaths in certain age-groups.*									
				Under 10 years	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males.......	28.1	329	42	17	46	51	46	37	16	18	21	35
	Females....	28.4	248	32	23	46	38	21	9	14	14	8	43
1892–1901.	Males.......	Deaths per 100,000 inhabitants of the same sex and age, in each age-group		7.0	16.3	25.9	42.7	36.5	27.9	24.1	15.5	18.3	12.6
	Females....			7.1	19.1	26.0	22.7	16.7	15.5	14.9	12.8	13.0	11.1
1892–1901.	The average number of deaths (both sexes) per 100 000 inhabitants in each age-group for the nine years, 1892-1901..............			7.0	17.7	26.0	32.7	26.8	21.9	19.8	14.3	15.9	11.9

*In each age-group both years are included.

TABLE 14.—*For the year 1902, and an average for the 10 years, 1892–1901, the per cent of reports (from regular correspondents to the State Board of Health, and others) stating the presence of typhoid fever in Michigan; also, for the same year and period of years, the average number of outbreaks, number of localities of outbreaks, the cases of sickness and the deaths reported from typhoid fever.*

Years.	Per cent of weekly postal reports stating the presence of typhoid fever.	Reported outbreaks of typhoid fever.	Reported localities of outbreaks of typhoid fever.	Reported cases of sickness from typhoid fever.	Reported deaths from typhoid fever.
1902........................	12	878	660	2,456	596
Average 10 years, 1892-1901....................	10	744	615	3,126	588

2.—The prevalence of typhoid fever, or any given disease, as indicated by the "per cent of reports" is taken from the weekly postal-card reports from regular correspondents of the State Board, health officers of cities and villages, and others. The "per cent of reports" is the per cent of the whole number of reports received which stated the presence of the disease named; it gives the relative prevalence of the disease, under the observation of the physicians who report. It may represent the relative area of prevalence of the disease, combined with the relative number of weeks the disease continued where it did occur, *but not the number of cases.*

The weekly card-reports, however, furnish a valuable means of ascertaining, approximately, the relative prevalence of the several diseases in a given year, and the relative prevalence of a given disease in one year compared with other years, and it is as good a scheme for ascertaining the facts as is yet available. Therefore the sickness statistics based upon those weekly card-reports should be relied upon for a comparison of the relative prevalence of typhoid fever in 1902, compared with preceding years. However, the evidence from the two sources may well be compared.

A comparison of the evidence from the two sources just mentioned, relative to typhoid fever during the years 1892-1901, is facilitated by Table 14.

Table 15 shows the depth of ground above water in wells, by months for the year 1902, and the average for the years 1878, 1880-1888, also the average of ground water by months during the ten years, 1892-1901, at all stations in Michigan where water in a well was measured.

TABLE 15.—HEIGHT OF GROUND WATER.—*Inches of earth above the water, by months for the year 1902; also averages for the 10 years, 1878, 1880-1888,* and for ten years, 1891-1901, at stations in Michigan.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878, 1880-1888.*..........	187	184	179	175	167	167	171	189	195	202	209	202	198
Av. 10 yrs., 1901, 1891-1899............	277	285	277	268	258	270	275	283	279	285	281	283	278
Av. in year 1902....	312	320	†324	320	317	315	310	308	304	307	305	305	305

* The stations at which the observations were made were different for each year in this period, but this average is useful for comparing the *months* in this period with each other, and, perhaps, for comparing one series of years with another, if allowance is made for the average difference between the periods. The names of these stations previous to the year 1884 are stated on page 106, Report Michigan State Board of Health, 1884. The names of stations for the years 1884-1902, are stated in the articles on "Meteorological Conditions in Michigan," in subsequent reports.

† The well at Lansing was dry.

TABLE 17.*—TYPHOID FEVER IN MICHIGAN.—*Average per cent of weekly card-reports stating the presence of typhoid fever, by months, for 10 years, 1878–1887, and in the year 1902; also the average for the 10 years 1892–1901.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878-87..	10	6	5	4	3	3	5	7	14	18	21	16	10
1902.................	12	10	6	7	6	9	9	10	15	21	19	14	14
Av 10 yrs., 1892-1901............	10	8	6	5	4	4	5	8	14	19	22	17	11

* TABLE 16 is on page 150.

TABLE 18.—RAINFALL IN MICHIGAN.—*Average number of inches, by months, for the 10 years, 1878–1887, and the year 1902; also the average for the 10 years, 1892–1901.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878-1887	37.27	2.09	2.89	2.28	2.49	3.52	4.24	3.44	3.21	3.72	3.45	2.98	2.69
1902	34.34	.82	.92	2.49	1.73	3.75	5.15	6.16	1.66	4.42	2.52	2.40	2.32
Av. 10 yrs., 1892-1901	31.00	2.21	1.79	2.22	2.28	3.61	3.02	2.91	2.48	2.82	2.67	2.73	2.28

TABLE 19.—TEMPERATURE OF THE WATER *in the well at the State Capitol in* **Lansing,** *Mich., by months for the year 1902; also the average for the ten years, 1892-1901.*

Year and period of years.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1902	*50	46	†	45	50	50	50	51	51	51	52	52	52
Av. 10 yrs., 1892-1901	46	41	34	48	44	45	45	46	46	47	37	37	41

* Average for 11 months.
† In February there was no water in the well.

TABLE 20.—*Sickness from typhoid fever in Michigan (as indicated by the weekly card-reports by all observers) and the depth of earth (in inches) above the water in the well, and the temperature of the water in the well at Lansing, Michigan, averages by year and months for the 10 years, 1892–1901.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sickness from typhoid fever*	10	8	6	5	4	4	5	8	14	19	22	17	11
Inches of earth above water in well	310	313	313	311	310	308	305	306	308	310	312	314	313
Temperature of water in well	46	41	34	48	44	45	45	46	46	47	37	37	41

* Per cent of all weekly card reports received (from observers in different parts of the State) which stated the presence of typhoid fever.

In 179 outbreaks, aggregating 443 cases, including 92 deaths, it was reported that the wells, the ordinary source of the drinking water, were within one hundred feet of privies.

In twenty outbreaks, aggregating sixty-seven cases, including nine deaths, it was reported that there were flies in or about the house, probably infecting the food. In one of these outbreaks the health officer says: "There were millions of flies in or about the house;" and in another outbreak, the health officer says: "Flies had free access."

In six outbreaks, the blood of the patient sick from typhoid fever was examined by the Widal test. Only one gave positive proofs of the typhoid bacillus, three were negative and two did not state whether or not the germ was found.

In fifty-one instances, typhoid fever was reported where the disease had previously been on the premises, the time between these cases, however, ranging from one month to twenty years.

TABLE 21.—*Exhibiting the average total annual rainfall at stations in Michigan, the same for Lansing, the inches of earth above the ground water at Lansing, the inches of water in an undisturbed well at Lansing, and the reported sickness, from typhoid fever in Michigan, as indicated by the per cent of all the weekly card-reports, which stated the presence of typhoid fever, during the year 1902, and averages for the 10 years, 1892–1901.*

Year and period of years.	Average total annual rainfall at stations in Michigan, in inches.	Total annual rainfall at Lansing, in inches.	Inches of earth above the ground water at Lansing.	Inches of water in an unused well at Lansing.	Ground water higher (+) or lower (—) than the 10 years average, in inches.	Average per cent of all weekly card-reports stating the presence of typhoid fever.	More (+) or less (—) sickness from typhoid fever than the 10 years average.
1982................	34.34	38.31	312	12	−2	12	+2
Av. 10 yrs., 1892-1901	31 00	31.59	310	14	....	10	....

DIPHTHERIA AND CROUP IN MICHIGAN.—YEAR ENDING DECEMBER 31, 1902.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

During the year ending December 31, 1902, there were reported to the Secretary of the State Board of Health, 494 outbreaks of diphtheria in 380 localities in Michigan, which resulted in 2,993 cases, including 500 deaths.

Throughout this article fatal cases of croup are included. For public health purposes, sanitarians now consider fatal croup to be diphtheria of the larynx.

For the year 1902 the same number of deaths from diphtheria and croup was reported to the office of the State Board of Health as was reported to the Department of the Secretary of State (as shown by the Bulletin of Vital Statistics)—394 from diphtheria and 106 from membranous croup and croup.

The average numbers of cases of sickness and deaths per outbreak were, cases, 6.1; deaths, 1.0. The fatality, i. e., the per cent of cases which proved fatal, was 16.4 deaths per 100 cases (Table 2). This fatality is exclusive of the deaths in the cities of Muskegon and Sault Ste. Marie, because only the fatal cases of diphtheria were reported from these cities,—seven fatal cases from Muskegon and five from Sault Ste. Marie.

Antitoxin treatment of diphtheria.—In the reports relating to diphtheria in Michigan during the year 1902, effort has been made to collect information relating to the use of diphtheria antitoxin. From reports made by health officers in different localities, it is evident that beneficial results have been attained through its use. In outbreaks where that agent has been made use of in the early stages of the disease, and properly administered, not only has the number of cases and deaths been diminished, but often a subsequent development of the disease has proved to be of a very mild type, which indicates to some extent the efficiency of antitoxin as an immunizing, as well as a curative agent.

The curative effect of antitoxin is shown in the summary, Table 1, where it may be seen that while antitoxin was used in but twenty-nine more outbreaks in 1902 than in 1901, it was used on 212 more sick persons in 1902, and the fatality for this year was less than in 1901. The fatality in those outbreaks in which antitoxin was used was less than the fatality in those outbreaks in which it was not used, and also less than the average fatality for the whole State, for each year, 1900, 1901 and 1902.

The decrease in fatality for a period of years since the use of antitoxin, which began in 1894, also the decrease in the numbers of cases and deaths per outbreak, is shown in Table 2.

The efficiency of antitoxin as an immunizing agent may be seen by the following: In 1902, in addition to the 801 sick persons treated with antitoxin, there were 495 persons, who were more or less exposed to the contagium of diphtheria, on whom antitoxin was used, and of this number only sixteen persons were reported to have afterwards taken the disease.

In these sixteen cases the severity of the disease was unquestionably mitigated, because three cases were reported as having slight attacks, two cases as having slight symptoms only, and two cases as having sore throat, one case sick only one day, and in the other a second dose of antitoxin was given and no membrane formed. Of the 495 exposed persons on whom antitoxin was used, 232 persons were reported definitely as having escaped taking the disease, and in regard to 101 exposed persons treated, it was reported, "Results, good". The result of treatment in 146 exposed persons was not stated.

TABLE 1.—*Summary of data relative to the use of diphtheria antitoxin in Michigan in 1900, 1901, and 1902.*

	Outbreaks.	Cases, sick.	Deaths.	Fatality-rate,—deaths per 100 cases.
All outbreaks	1900—493 1901—525 1902—494	2.706 2,498 2,993	528 493 500	19.5 19.7 * 16.4
Outbreaks in which antitoxin was used	1900—135 1901—184 1902—213	535 589 801	81 90 109	15.1 15 3 13.6
Outbreaks in which antitoxin was not used	1900—358 1901—341 1902—281	2 171 1.909 2,192	477 403 391	20.6 21 1 17.8

* Exclusive of the deaths in the cities of Muskegon and Sault Ste. Marie, from which cities only fatal cases of diphtheria were reported.

Below are quoted a few extracts from reports of health officers in different localities who have made use of antitoxin in diphtheria outbreaks in 1902:

"Had antitoxin used on all children in the settlement, and on all grown people that were in the isolated houses. Not one of them (twenty-one exposed persons on whom antitoxin was used) have shown any signs of it. My own boy, seven years old, played with the L—— boy two days before; he did not know it to be dangerous. Used 1,000 units of antitoxin."—*Alva Hillier, Dafter township, Chippewa county.*

"Perfectly immunized in spite of continued exposure. In one instance, a six-year-old child had a very slight attack of pharyngeal diphtheria eleven days after immunization (continued exposure), which disappeared with 500 units of antitoxin in less than twelve hours. The first immunizing dose certainly moderated the disease in this instance." *Theo. Schmalzreidt, M. D., Woodmere village, Wayne county.*

"Two out of forty-six taken sick—both severe—in one of them it was the second attack in three years. Twenty-two, from two to twenty-one years of age, were exposed for from four to ten days, of which number five took the disease."—*Theo. Schmalzriedt, M. D., Woodmere village, Wayne county.*

"Eight cases exposed and antitoxin used, none had the disease. Exposed and antitoxin not used, one case had disease."—*F. P. Lawton, M. D., Traverse City, Grand Traverse county.*

Many reports of a similar nature were received from physicians throughout the State commending the antitoxin treatment.

Distribution of reported diphtheria by counties in 1902.—Table 3 shows, in addition to the actual numbers of reported cases and deaths by counties, the sickness and death-rates per 100,000 of population in each county; thus rendering the relative amount of sickness and death from this disease in the several counties more readily conceivable.

TABLE 2.—*Exhibiting for the ten years, 1884-1893, the numbers of reported outbreaks, localities, cases and deaths; average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal (fatality rate) for each of the ten years, 1884-1893, before the use of antitoxin. Also a similar average for nine years, 1894-1902, since the beginning of the use of antitoxin.*

Year.	Reported outbreaks.	Reported localities.	Reported cases.	Average cases per outbreak.	Reported deaths.	Average deaths per outbreak.	Deaths per 100 cases.
1884	362	302	3,915	10.8	905	2.5	23.0
1885	467	396	4,018	8.6	964	2.0	24.0
1886	550	422	4,244	7.7	982	1.8	23.0
1887	466	371	3,382	7.3	825	1.8	24.4
1888	337	283	2,228	6.6	532	1.6	23.9
1889	398	329	3,157	7.9	683	1.7	21.6
1890	442	365	4,206	9.5	1,050	2.4	25.0
1891	535	461	4,385	8.2	1,002	1.9	22.8
1892	527	463	4,818	9.1	1,099	2 1	22.8
1893	546	460	4,736	8.7	1,092	2.0	23.1
Average for 10 years, 1884-93	463	385	3,909	8.4	913	2.0	23.4
1894*	435	367	3,852	8.9	744	1.7	*19.3
1895	401	347	3,433	8.6	708	1.8	20.6
1896	423	331	4,013	9.5	757	1.8	18.9
1897	495	396	4,132	8.3	756	1.5	18.3
1898	439	354	2,357	5.4	477	1.1	20.2
1899	366	303	2,154	5.89	435	1.19	20.2
1900	493	399	2,706	5.49	528	1.07	19.5
1901	525	412	2,498	4.76	493	.94	19.7
1902	494	380	2,993	6.1	500	1.0	†16.4
Average for 9 years, 1894-1902	452	365	3,126	6.91	600	1.33	19.2
Departure of average for 9 years, 1894-1902, from average for 10 years, 1884-93.	—11	—20	—783	—1.5	—313	—.67	—4.2

* The use of antitoxin for diphtheria was commenced about this time.

† Exclusive of the cases in the cities of Muskegon and Sault Ste. Marie, from which cities only the fatal cases were reported.

Sickness-rates from reported diphtheria in 1902.—Table 3 shows that the sickness-rate for the whole State for the year was 121.8‡ per 100,000 of population. By counties, the greatest sickness-rate (1,021.5) was in Gogebic county; and the lowest, where sickness was reported (5.5), was in Osceola county. From nine counties no sickness from diphtheria was reported.

Death-rates from reported diphtheria in 1902.—The death-rate for the State was 20.2 per 100,000 of population. The highest death-rate (112.4) was in Presque Isle county; and the lowest, where deaths occurred (2.5 of one death per 100,000 of population), was in Ingham county. Allegan (2.6) and Shiawassee (2.9) counties were nearly as low. In six counties from which sickness from diphtheria was reported there were no reported deaths from this disease.

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‡ Exclusive of cases in the cities of Muskegon and Sault Ste. Marie, from which only fatal cases of diphtheria were reported.

TABLE 3.—*Number of cases and deaths reported from diphtheria per 100,000 persons living in each county in Michigan during the year 1902. Compiled from reports of health officers, clerks, etc.*

State and Counties.	Estimated population for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State.........	2,480,762	2,993	500	†121.8	20.2
Alcona.......	5,781	0	0	0	0
Alger.........	7,358	6	2	81.5	27.2
Allegan.......	38,686	4	1	10.3	2.6
Alpena.......	18,432	48	10	260.4	54.3
Antrim.......	17,944	5	2	27.9	11.1
Arenac.......	10,779	7	1	64.9	9.3
Baraga.......	4,350	0	0	0	0
Barry.........	22,118	6	0	27.1	0
Bay...........	62,734	32	6	51.0	9.6
Benzie.......	10,221	0	0	0	0
Berrien.......	50,339	15	2	29.8	4.0
Branch.......	28,343	3	2	10.6	7.1
Calhoun......	49,927	206	35	412.6	70.1
Cass..........	20,776	31	2	149.2	9.6
Charlevoix...	14,718	5	4	34.0	27.2
Cheboygan...	16,144	20	0	123.9	0
Chippewa....	23,338	17	8	‡102.5	34.3
Clare.........	8,486	4	2	47.1	23.6
Clinton.......	24,760	6	0	24.2	0
Crawford....	3,019	0	0	0	0
Delta.........	25,417	25	6	98.4	23.6
Dickinson....	18,932	42	3	221.8	15.8
Eaton........	31,352	13	4	41.5	12.8
Emmet.......	17,777	14	0	78.8	0
Genesee......	42,220	31	5	73.4	11.8
Gladwin......	7,116	5	1	70.3	14.1
Gogebic......	17,622	180	19	1,021.5	107.8
Gd. Traverse.	21,465	15	4	69.9	18.6
Gratiot.......	30,259	7	0	23.1	0
Hillsdale.....	29,729	5	2	16.8	6.7
Houghton....	73,353	76	11	103.6	15.0
Huron........	34,796	37	4	106.3	11.5
Ingham.......	39,860	45	1	112.9	2.5
Ionia.........	34,165	26	6	76.1	17.6
Iosco.........	9,548	8	3	83.8	31.4
Iron..........	10,220	11	2	107.6	19.6
Isabella......	23,230	30	4	129.1	17.2
Jackson......	48,782	15	4	30.7	8.2
Kalamazoo...	45,060	53	10	117.6	22.2
Kalkaska.....	7,629	47	2	616.1	26.2
Kent..........	132,302	54	11	40.8	8.3

Counties.	Estimated population for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
Keweenaw..	3,353	0	0	0	0
Lake.........	4,643	8	1	172.3	21.5
Lapeer.......	27,229	51	8	187.3	29.4
Leelanau.....	10,882	1	1	9.2	9.2
Lenawee.....	48,360	21	4	43.4	8.3
Livingston....	19,406	15	2	77.3	10.3
Luce.........	3,193	0	0	0	0
Mackinac....	7,857	0	0	0	0
Macomb......	33,528	28	6	83.5	17.9
Manistee.....	28,434	11	4	38.7	14.1
Marquette....	42,313	302	25	713.7	59.1
Mason........	19,037	19	1	99.8	5.3
Mecosta......	20,681	15	4	72.5	19.3
Menominee..	28,144	12	5	42.6	17.8
Midland......	14,845	11	0	72.8	0
Missaukee....	10,088	4	2	39.7	19.8
Monroe.......	32,612	28	7	85.9	21.5
Montcalm....	32,286	10	2	31.0	6.2
Montmorency	3,498	6	1	171.5	28.6
Muskegon....	36,980	10	9	‡18.8	24.3
Newaygo....	17,189	14	4	81.4	23.3
Oakland......	45,496	17	5	37.4	11.0
Oceana.......	16,658	5	3	30.0	18.0
Ogemaw......	8,473	0	0	0	0
Ontonagon...	5,971	5	3	83.7	67.0
Osceola......	18,319	1	1	5.5	5.5
Oscoda.......	1,356	1	1	73.7	73.7
Otsego........	6,633	1	1	15.1	15.1
Ottawa.......	39,859	15	2	37.6	5.0
Presque Isle.	9,787	43	11	439.4	112.4
Roscommon..	1,829	0	0	0	0
Saginaw......	81,014	56	8	69.1	9.9
Sanilac.......	35,423	39	4	110.1	11.3
Schoolcraft..	8,141	4	2	49.1	24.6
Shiawassee..	34,202	36	1	105.3	2.9
St. Clair......	55,528	65	10	117.1	18.0
St. Joseph...	23,489	7	1	29.8	4.3
Tuscola......	36,380	34	7	93.5	19.2
Van Buren...	34,008	10	2	29.4	5.8
Washtenaw..	49,177	35	11	71.2	22.4
Wayne.......	367,565	874	158	237.8	42.9
Wexford.....	17,775	25	4	140.6	22.5

* Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

† This rate is computed exclusive of population and cases in the cities of Sault Ste. Marie and Muskegon, because only the five fatal cases were reported from Sault Ste. Marie and seven fatal cases from Muskegon.

‡ The case-rates in Chippewa and Muskegon counties are computed exclusive of the population and cases in Sault Ste. Marie and Muskegon cities, in their respective counties, because only fatal cases were reported from these cities.

The proportionate case-rate, death-rate, and fatality or case mortality, from reported diphtheria, in cities, villages, and townships.—From the data in Table 4 it may be observed that 75 per cent of the cities, 17.5 per cent of the villages, and 21.9 per cent of the townships in the State, were infected with diphtheria in 1902, but the average population of the cities is nearly fourteen times the average of the villages.* The highest case-rate (184.0 per 100,000 inhabitants) and death-rate (29.7) occurred in the cities, the case-rate in the cities being nearly double (92.7), and the death-rate more than double the death-rate in the villages (13.2). The case-rate in the townships was 80.1 per 100,000 inhabitants, and the death-rate was 14.1.

According to the reports, the highest fatality, 17.6 deaths per 100 cases, occurred in the townships, this being some higher than the fatality for the whole State (16.4). The lowest fatality apparently occurred in the villages; possibly this was due to a more complete reporting of all cases which occurred in the villages.

TABLE 4.—*Exhibiting the numbers of outbreaks and cases of and deaths from diphtheria which occurred in the cities, villages, and townships of Michigan in 1902, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages and townships. Compiled from reports of local health officials to the Secretary of the State Board of Health.*

Classes of political divisions and numbers of each class of divisions.	Estimated population.	Health jurisdictions.	Outbreaks in—			Cases.	Deaths.	Fatality. (Per cent deaths of cases.)	Rates per 100,000 population.	
			Infected localities.							
			No. of	Per cent of all localities.	No. of				Cases.	Deaths.
State (83 counties)..........	2,480,762	1,603	380	23.7	494	2,993	500	*16.4	†121.8	20.2
Cities (80)....................	980,428	80	60	75.0	98	1,756	291	*16.0	†184.0	29.7
Villages (315)................	279,362	315	55	17.5	72	259	37	14.3	92.7	13.2
Townships (1,208)...........	1,220,972	1,208	265	21.9	324	978	172	17.6	80.1	14.1

*Exclusive of cases in the cities of Muskegon and Sault Ste. Marie, from which cities only fatal cases were reported.

†Rate computed excluding population and cases in the cities of Muskegon and Sault Ste. Marie, from which cities only fatal cases were reported.

Distribution of reported diphtheria by months in 1902.—The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. There may be a time during the outbreak where no cases are present, but if the subsequent cases can be attributed to infection from preceding ones, it is called one outbreak. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported, and sometimes the month in which the outbreak ended is given without the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months; there were eight more beginnings than endings of outbreaks reported during the year 1902.

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* In 1902, the average population of each of the cities was 12,255, of the villages, 887, and of the township, 1,011.

TABLE 5.—*Exhibiting the number of outbreaks of diphtheria which were reported to have begun, to have ended, and the number which were present, in each month of the year 1902, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began..	51	33	25	21	35	26	28	25	35	37	51	68	435
Outbreaks ended..	35	37	38	29	37	26	27	23	21	28	48	78	427
Outbreaks present.	93	90	81	66	73	62	62	62	76	94	117	143	....

EXHIBIT 1.—*The number of deaths from diphtheria and croup* in each month of the year 1902; and the per cent the deaths from each of the specified causes, in each month, were of all the deaths from that disease, the dates of which were reported to the office of the State Board of Health.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Deaths from diphtheria	27	26	23	21	20	24	21	30	44	59	37	52	384
Per cent...........	7.0	6.8	6.0	5.5	5.2	6.3	5.5	7.8	11.5	15.4	9.6	13.5	....
Deaths from croup*	11	11	11	11	9	4	2	5	6	11	10	16	106
Per cent...........	10.4	10.4	10.4	10.4	8.5	3.8	1.9	4.7	5.7	10.4	9.4	15.1	....

* Includes membranous croup.

Exhibit 1 indicates that diphtheria of the pharynx (ordinary diphtheria) is not so dependent upon cold atmosphere as is diphtheria of the larynx (croup).

The first line in Table 6 shows the number of localities in Michigan at which diphtheria was reported present in each month of the year 1902. The second line shows the per cent these localities were of the total number of infected localities reported for the year.

The third line shows the number of cases present in each month of the year; and the fourth line shows the per cent the cases present in each month were of all cases reported concerning which this information was stated. There were 192 cases of which the month or months in which they were present were not reported.

The fifth line of the table shows the number of cases taken sick in each month; and the last line shows the per cent the cases taken sick in each month were of the total number of these cases. There were 289 cases of which the months in which they were taken sick were not reported.

Table 6 shows the influence of seasonal changes upon the prevalence of the disease. While present in the State during the entire year, a marked increase in the number of reported cases of diphtheria is noticeable during the month of October, this increase continuing through November and December. The disease was least prevalent in July, and the month in

The proportionate case-rate, death-rate, and fatality or case mortality, from reported diphtheria, in cities, villages, and townships.—From the data in Table 4 it may be observed that 75 per cent of the cities, 17.5 per cent of the villages, and 21.9 per cent of the townships in the State, were infected with diphtheria in 1902, but the average population of the cities is nearly fourteen times the average of the villages.[*] The highest case-rate (184.0 per 100,000 inhabitants) and death-rate (29.7) occurred in the cities, the case-rate in the cities being nearly double (92.7), and the death-rate more than double the death-rate in the villages (13.2). The case-rate in the townships was 80.1 per 100,000 inhabitants, and the death-rate was 14.1.

According to the reports, the highest fatality, 17.6 deaths per 100 cases, occurred in the townships, this being some higher than the fatality for the whole State (16.4). The lowest fatality apparently occurred in the villages; possibly this was due to a more complete reporting of all cases which occurred in the villages.

TABLE 4.—*Exhibiting the numbers of outbreaks and cases of and deaths from diphtheria which occurred in the cities, villages, and townships of Michigan in 1902, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages and townships. Compiled from reports of local health officials to the Secretary of the State Board of Health.*

Classes of political divisions and numbers of each class of divisions.	Estimated population.	Health jurisdictions.	Outbreaks in—			Cases.	Deaths.	Fatality. (Per cent deaths of cases.)	Rates per 100,000 population.	
			Infected localities.							
			No. of	Per cent of all localities.	No. of				Cases.	Deaths.
State (83 counties)	2,480,762	1,603	380	23.7	494	2,993	500	*16.4	†121.8	20.2
Cities (80)	980,428	80	60	75.0	98	1,756	291	*16.0	†184.0	29.7
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Townships (1,208)	1,220,972	1,208	265	21.9	324	978	172	17.6	80.1	14.1

*Exclusive of cases in the cities of Muskegon and Sault Ste. Marie, from which cities only fatal cases were reported.

†Rate computed excluding population and cases in the cities of Muskegon and Sault Ste. Marie, from which cities only fatal cases were reported.

Distribution of reported diphtheria by months in 1902.—The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. There may be a time during the outbreak where no cases are present, but if the subsequent cases can be attributed to infection from preceding ones, it is called one outbreak. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported, and sometimes the month in which the outbreak ended is given without the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months; there were eight more beginnings than endings of outbreaks reported during the year 1902.

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[*] In 1902, the average population of each of the cities was 12,255, of the villages, 887, and of the township, 1,011.

TABLE 5.—*Exhibiting the number of outbreaks of diphtheria which were reported to have begun, to have ended, and the number which were present, in each month of the year 1902, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began..	51	33	25	21	35	26	28	25	35	37	51	68	435
Outbreaks ended..	35	37	38	29	37	26	27	23	21	28	48	78	427
Outbreaks present.	93	90	81	66	73	62	62	62	76	94	117	143	....

EXHIBIT 1.—*The number of deaths from diphtheria and croup* in each month of the year 1902; and the per cent the deaths from each of the specified causes, in each month, were of all the deaths from that disease, the dates of which were reported to the office of the State Board of Health.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Deaths from diphtheria	27	26	23	21	20	24	21	30	44	59	37	52	384
Per cent...........	7.0	6.8	6.0	5.5	5.2	6.3	5.5	7.8	11.5	15.4	9.6	13.5	....
Deaths from croup*	11	11	11	11	9	4	2	5	6	11	10	16	106
Per cent...........	10.4	10.4	10.4	10.4	8.5	3.8	1.9	4.7	5.7	10.4	9.4	15.1	....

* Includes membranous croup.

Exhibit 1 indicates that diphtheria of the pharynx (ordinary diphtheria) is not so dependent upon cold atmosphere as is diphtheria of the larynx (croup).

The first line in Table 6 shows the number of localities in Michigan at which diphtheria was reported present in each month of the year 1902. The second line shows the per cent these localities were of the total number of infected localities reported for the year.

The third line shows the number of cases present in each month of the year; and the fourth line shows the per cent the cases present in each month were of all cases reported concerning which this information was stated. There were 192 cases of which the month or months in which they were present were not reported.

The fifth line of the table shows the number of cases taken sick in each month; and the last line shows the per cent the cases taken sick in each month were of the total number of these cases. There were 289 cases of which the months in which they were taken sick were not reported.

Table 6 shows the influence of seasonal changes upon the prevalence of the disease. While present in the State during the entire year, a marked increase in the number of reported cases of diphtheria is noticeable during the month of October, this increase continuing through November and December. The disease was least prevalent in July, and the month in which the fewest cases were taken sick was July. In the warm months there was less diphtheria than in the cold months. The greatest prevalence of the disease was in October, November and December, following the opening of the public schools in September. But the increase of the disease begins before the schools open, showing the influence of the low temperature in increasing the disease.

TABLE 6.—*Exhibiting the number and per cent of localities from which the presence of diphtheria was reported, the number and per cent of cases of diphtheria present and the number and per cent of cases taken sick, in Michigan in each month during the year 1902. (Includes each case for which, the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of localities..............	* 380	92	89	80	65	73	62	62	61	76	94	115	140
Per cent of localities..............	....	24.2	23.4	21.1	17.1	19.2	16.3	16.3	16.1	20.0	24.7	30.3	36.8
Number of cases present...........	† 2,801	202	233	237	165	203	216	150	193	277	475	557	589
Per cent of cases present...........	....	7.2	8.3	8.5	5.9	7.2	7.7	5.4	6.9	9.9	17.0	19.9	21.0
Number of cases taken sick........	‡ 2,704	191	183	174	119	157	163	103	148	205	368	448	445
Per cent of cases taken sick.	100	7.1	6.8	6.4	4.4	5.8	6.0	3.8	5.5	7.6	13.6	16.6	16.5

* Total number of localities reported infected with diphtheria in 1902.

† There were 2,993 cases of diphtheria reported in 1902; in 2,801 of these cases the month or months in which they were present were reported, leaving 192 cases of which this information was not stated.

‡ Of the 2,993 cases of diphtheria reported in 1902, the months in which they were taken sick were reported in 2,704 instances.

Source of contagium of diphtheria, and how the disease is spread.—Of the 2,993 cases of diphtheria reported during the year 1902, the local health officers reported the source of contagium as follows: Traced to a former case, 682; probably to a former case, 8; traced to a case of sore throat, 1; to infected articles, houses, etc., 5; attributed to unsanitary conditions, 11; to outside jurisdictions, 46; probably from outside jurisdictions, 19; unknown, or reports not definite (including cases, the source of which was reported as from "contagium", or "sporadic", "spontaneous", etc.), 1,274; source not stated, 947. This last number includes twenty-five cases, the only information of which was received through the State Department death certificates.

Cases of diphtheria traced to preceding cases of the disease.—As shown above, 682 of the 2,993 reported cases of diphtheria in Michigan in 1902, were traced to preceding cases of the disease. Had all first cases in the various jurisdictions been properly isolated, no doubt a large part of these 682 cases would have been prevented.

In 1902, as in previous years, the source of contagium of a number of cases was attributed to "unsanitary conditions." While such conditions may favor the spread of the disease and cause it to assume increased malignancy, the "germ" or contagious principle of the disease, must be present or the disease will not exist.

Movement of infection of diphtheria—outbreaks traced to outbreaks in other localities.—The infection of diphtheria was reported by local officers to have spread from thirty-nine localities to other (second) localities, resulting in sixty-one outbreaks, with an aggregate of one hundred and seventy-five cases, including twenty-eight deaths; from one of these second localities the contagium was spread to another (third) locality, resulting in one case. Fourteen outbreaks with an aggregate of sixty-four cases, including nine deaths, were reported traced to localities outside of Michigan; and from one of the localities in the State the infection was further spread to one locality, resulting in one fatal case. The source of infection of twenty-three outbreaks, with two hundred and forty-seven cases, including twenty-six deaths, was reported as probably from other localities or jurisdictions in Michigan; and from two of these (second) localities the infection was probably spread to two jurisdictions, resulting in fifty cases, including three deaths. Four outbreaks with seven cases, including two deaths, were reported as probably from outbreaks outside the State.

Immigrants possibly exposed to diphtheria destined to settle in Michigan.—During the year, two notices of immigrants possibly exposed to diphtheria destined to settle in Michigan were received at this office,—one from the Immigrant Officer at Quebec, Canada, and one from the United States Commissioner of Immigrants, at Philadelphia, Pa. These notices gave the names and destinations of immigrants on board intending to settle in Michigan. Copies of these notices, including the lists of the names of the immigrants, were made on blanks designed in this office for this purpose, and promptly sent from this office to the health officers of the jurisdictions where the immigrants intended to settle. The purpose of such action is to aid the local health officials in preventing outbreaks of dangerous communicable diseases, and, as a matter of fact, this method of forewarning the health officials of the localities where possibly infected immigrants are destined to settle has been productive of good results, and in recent years while these measures have been in use, very few outbreaks have been traced to immigrants.

During the year 1902, immigrants possibly exposed to diphtheria, were reported destined to settle in the cities of Bessemer, Ironwood, Marquette and Ishpeming. With the exception of Marquette, diphtheria was reported present in these cities practically throughout the year, but no cases were reported by the local health officers traced to immigrants. In Marquette, the three cases reported occurred in December, and the notice was received in November, but the source of these cases was reported as unknown, and the names were not those of the exposed immigrants. From the other jurisdictions where possibly exposed immigrants were reported destined to settle, no outbreaks were reported at or near the date of their arrival.

Estimated number of cases of diphtheria prevented and lives saved by isolation and disinfection.—Tables 7 and 8 and diagram [Plate No. 1191] compare the average numbers of cases and deaths in outbreaks of diphtheria where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 7 it may be seen that during the sixteen years, 1887-1902, there were nearly five times as many cases and deaths per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Tables 7 and 8 it may be seen that during the year 1902 there were reported to the office of the State Board of Health 464 outbreaks of diphtheria, with 1,609 cases, including 290 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 2,422 cases, including 469 deaths, and taking from these respectively the cases (1,609), including deaths (290) which did occur, leaves 813 cases, including 179 deaths, indicated as prevented in these 464 outbreaks by isolation and disinfection. By the same method of computation for each year the indicated saving, during the sixteen years, 1887-1902, is 36,598 cases, including 7,242 lives.

Definition of outbreak.—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the later cases are considered as part of the same outbreak. Possibly the sixty-day limit may at some future time be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area. Also, comparisons of *years* require that outbreaks be counted as closed, at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains any apparent discrepancy between the numbers of outbreaks, cases and deaths here given and the numbers given at the beginning of this article.

Incubation period in diphtheria.—By Table 9 it may be seen that for ten years, 1892-1901, the period of incubation in diphtheria was reported in the greatest number of instances as seven days (212 instances), and the incubation period reported in the next greatest number of instances was five days, in 114 instances. Seven days were also reported in the most instances in 1902. The total number of instances in which the period of incubation was reported in days was, for the ten years 1,157, and for the year 1902 it was reported in 101 instances. The average reported period of incubation for the ten years was 8.3 days, and for the year 1902 it was 7.2 days.

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*In the compilation of the reports for Tables 7 and 8 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate and disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate and disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

TABLE 7.—DIPHTHERIA IN MICHIGAN, 1887-1902.—*Exhibiting for the 16 years, and for each of the 16 years 1887-1902, the numbers of reported outbreaks, cases and deaths; also for this 16 year period, the average number of cases and deaths per outbreak in all outbreaks; in those outbreaks in which isolation or disinfection was doubtful; in which both isolation and disinfection were neglected; in which both isolation and disinfection were enforced; and also the numbers of cases and deaths indicated to have been prevented by isolation and disinfection.*

Years.	All outbreaks.*			Isolation and disinfection, or both, not mentioned, or statements doubtful.			Isolation and disinfection both neglected.			Isolation and disinfection both enforced.			Indicated saving of cases and lives by isolation and disinfection.	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1887	398	2,321	561	202	732	190	60	822	195	78	198	51	†3,132	†733
1888	311	1,529	324	199	810	189	34	527	81	58	101	31	3,292	416
1889	376	1,986	418	254	1,314	280	41	478	108	63	98	14	2,398	570
1890	439	2,713	619	291	1,649	401	71	902	169	46	70	15	2,862	426
1891	532	2,965	643	366	1,777	389	79	944	194	70	157	33	3,392	666
1892	525	3,485	740	323	2,341	456	52	657	147	49	105	24	3,146	746
1893	536	3,133	746	303	1,681	362	74	1,020	282	65	159	45	4,253	1,296
1894	420	2,262	404	202	986	174	56	738	122	81	176	37	3,274	512
1895	388	2,292	425	178	1,102	209	45	610	119	70	146	28	2,969	599
1896	405	2,460	432	153	925	165	64	794	142	69	164	27	2,566	467
1897	464	2,838	497	165	916	137	100	1,366	252	93	225	46	3,500	672
1898	399	1,535	308	127	516	114	79	539	103	77	149	28	1,186	211
1899	348	1,116	248	106	391	92	68	272	73	91	213	34	276	124
1900	460	1,595	343	148	571	150	92	446	85	99	169	30	636	80
1901	502	2,020	391	165	599	138	88	781	132	127	254	49	2,438	362
1902	464	1,609	290	137	516	93	83	465	90	122	255	39	813	179
Totals for the 16 years, 1887-1902	6,967	35,859	7,389	3,319	16,826	3,559	1,092	11,361	2,294	1,258	2,639	531	‡40,133 ‡36,598	8,059 7,242
Average for the 16 years, 1887-1902	435	2,241	462	207	1,052	221	68	710	143	79	165	33	2,508	504
Average cases and deaths per outbreak for the 16 years, 1887-1902	....	5.15	1.06	....	5.07	1.06	....	10.40	2.10	....	2.10	.42	....	....

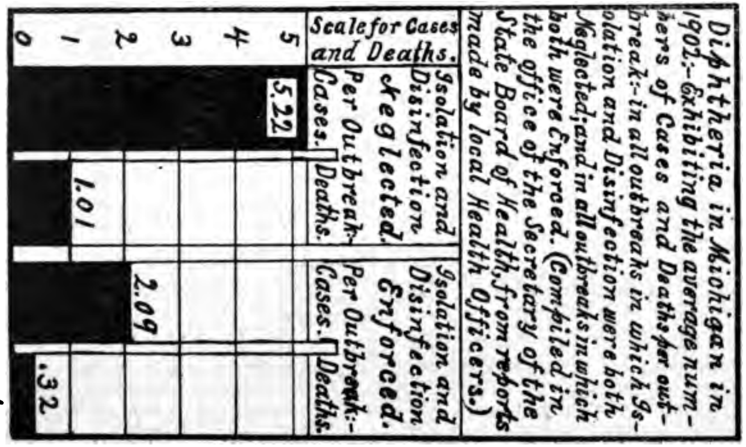
* These do not include the cases and deaths in a number of the larger cities (foot-note to Table 8), because of the difficulty in determining the beginning and ending of an outbreak in those cities in which the disease was present in some part of the city nearly all the year. † The numbers of cases and deaths in this double column are found by multiplying "All outbreaks" for each year by the average number of cases, or deaths per outbreak in those outbreaks in which "Isolation and disinfection both were neglected," for that year, and deducting from the result thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year. ‡ The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows: (1) the 40,133 cases and 8,059 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note; (2) the 36.598 cases and 7.242 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the sixteen years, 1887-1902 (10-40 and 2.10 where isolation and disinfection were neglected), by the total number of outbreaks to find the numbers which would have occurred if all outbreaks had been neglected and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the sixteen year period.

TABLE 8.—DIPHTHERIA IN MICHIGAN IN 1902.—*Exhibiting the average numbers of cases and deaths per outbreak—(1) in all the 464 outbreaks reported; (2) in the 137 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 7 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 38 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 52 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 19 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 89 outbreaks in which isolation and disinfection were both neglected; (8) in the 122 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (464 outbreaks.*)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (137 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (7 outbreaks.)		(4) Isolation enforced—disinfection doubtful. (38 outbreaks.)		(5) Disinfection enforced—isolation neglected. (52 outbreaks.)		(6) Isolation enforced—disinfection neglected. (19 outbreaks.)		(7) Isolation and disinfection both neglected. (89 outbreaks.)		(8) Isolation and disinfection both enforced. (122 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals..........	1,609	290	516	93	31	7	70	12	245	42	27	7	465	90	255	39
Averages........	3.46	.63	3.77	.68	4.43	1.00	1.84	.32	4.71	.81	1.42	.37	†5.22	†1.01	†2.09	†.32

*These do not include the cases and deaths in Detroit, Grand Rapids, Kalamazoo, Battle Creek, Saginaw, Bessemer, and a few other cities, because of the difficulty in determining the beginning and ending of an outbreak in these localities, in which the disease was present in some part of the locality nearly all the year. †These figures are graphically represented in the diagram, Plate 1191, on this page.

ISOLATION AND DISINFECTION RESTRICT DIPHTHERIA.



This diagram graphically represents the lower line of figures in the last four columns of Table 8.

[PLATE 1191.]

TABLE 9.—*Exhibiting for the ten years, 1892-1901, and for the year 1902, the reported period of incubation in days, in cases of diphtheria in Michigan. Compiled from reports of health officers in Michigan.*

Incubation period—days...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Instances* in each day, for ten years, 1892–1901.......	18	80	77	91	114	69	212	81	68	101	19	30	13	80	26	6	6
Instances* in each day, for the year, 1902.............	3	6	8	12	12	6	17	6	6	10	2	2	1	7	1	....	....
Incubation period—days ..	18	19	20	21	22	24	25	28	29	30	31	32	35	36	40	43	46
Instances* in each day, for ten years, 1892–1901.......	7	2	6	15	4	8	3	8	1	6	1	1	....	1	1	1	1
Instances* in each day, for the year, 1902.............	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....

* In many of these instances it was reported as *about* the number of days stated.

Ages of fatal and non-fatal cases of reported diphtheria.—Of the 2,993 persons sick with diphtheria in 1902, the ages of patients were reported in 2,269 instances. Of the 500 decedents, the ages were reported in 486 instances. Table 10 shows that the fatality was highest in children under five years of age, and especially high (seventy per cent) in infants under one year. Table 11 shows that during the ten years 1892-1901, the ages of 22,158 cases of diphtheria, including the ages of 4,883 decedents, were reported to this office. Of these, the greatest per cent was from five to nine years of age; and about seventy-seven per cent of this number (22,158) was under fourteen years of age. The greatest per cent of the ages of decedents was under five years, and about seventy-seven per cent was in children under ten years. For a period of nine years, 1893-1901, the greatest per cent of the ages of the decedents was under five years, both for males and for females. (Table 12.)

Average age of fatal and non-fatal cases of reported diphtheria.—Table 12 shows that the average age of fatal cases for 1902 was 6.1 years for males and 7.0 years for females; and for the nine years, 1893-1901, it was 6.7 for males and 7.3 years for females. Table 13 shows that the average age of non-fatal cases was 10.9 years for males and 12.9 years for females in 1902; for the period of years, 1893-1901, it was 10.8 for males and 13.1 years for females.

Duration of sickness of fatal and non-fatal cases.—Of the 500 fatal cases of diphtheria in 1902, the duration of sickness was reported in 253 instances; 143 of these were males and 110 were females. Table 14 shows that the duration of sickness of fifty-four per cent of the males and fifty-two per cent of the females ranged from one to five days. Ninety-two per cent of males and ninety-seven per cent of females were sick from one to fifteen days. For the nine-year period, 1893-1901, the duration of only seventy-five per cent, both of males and females, range from one to fifteen days. Of the non-fatal cases of diphtheria in 1902, seventy-eight per cent of both sexes recovered before the sixteenth day of sickness; and for the nine years, sixty-nine per cent of males and sixty-eight per cent of females were sick less than sixteen days.

TABLE 10.—*Exhibiting in certain age-groups, the numbers of cases and deaths from diphtheria, the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths of known ages; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1902, which stated the ages.*

Ages in groups of years.	All known ages.	0-1.	1-2.	2-3.	3-4.	4-5.	Under 5.	5 9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50 and over.
	Number and per cent of cases and deaths in certain age-groups.																
No. of cases*..........	2,269	47	81	102	153	151	534	802	412	200	123	70	49	28	29	11	11
Per cent the cases in each group were of all cases of known ages..................	100	2.1	3.6	4.5	6.7	6.7	23.5	35.3	18.2	8.8	5.4	3.1	2.2	1.2	1.3	.5	.5
No. of deaths..........	486	33	47	46	57	47	230	162	50	22	11	5	4	0	1	0	1
Per cent the deaths in each group were of all cases in that group	21.4	70.2	58.0	45.1	37.2	31.1	43.1	20.2	12.1	11.0	9.0	7.1	8.2	0	3.4	0	9.1
Per cent the deaths in each group were of deaths, known ages..	100	6.8	9.7	9.5	11.7	9.7	47.3	33.3	10.3	4.5	2.3	1.0	.8	0	.2	0	.2
Per cent the deaths in special groups were of all deaths, known ages..................	......	47.3					80.7		17.1			2.3					

* Does not include those cases or deaths where the age was not stated.

TABLE 11.—*Exhibiting in certain age-groups, the numbers of cases and deaths from diphtheria in the year 1902; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths, also totals for the 10 years, 1892-1902. Compiled from all reports for the years 1892-1902, which stated the ages.*

Year.		Total No. included.	All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
			Per cent of cases and deaths in certain age-groups.											
1902.	Cases..............	2,269	100	23.5	35.3	18.2	8.8	5.4	3.1	2.2	1.2	1.3	.5	.5
	Deaths..............	486	100	47.3	33.3	10.3	4.5	2.3	1.0	.8	0	.2	0	.2
1892-1901.	Cases..............	22,158	100	25.9	32.5	18.6	8.5	4.7	3.4	2.6	1.6	1.0	.6	.6
	Deaths..............	4,883	100	44.2	33.2	13.3	4.3	1.9	1.2	.7	.4	.2	.2	.4

TABLE 12.—*Exhibiting, by sex and in certain age-groups, the per cent of persons who died from diphtheria in Michigan in 1902, and during the 9 years, 1893-1901; also the average age of death, and the number of deaths included. Compiled from such reports as stated the ages.*

Deaths from diphtheria.											
Year.	Sex.	Average age, years.	No. of deaths included.	Ages.—In periods of years. Per cent of deaths in each period of age.							
				All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 years and over.
1902.	Males....	6.1	262	100	51.1	32.1	8.4	4.6	2.3	.8	.8
	Females..........	7.0	224	100	42.9	34.8	12.5	4.5	2.2	1.3	1.8
1893-1901.	Males.............	6.7	2,093	100	45.3	34.0	12.3	4.5	1.7	.7	1.5
	Females..........	7.3	2,314	100	39.9	34.2,	15.1	4.4	1.9	1.9	2.6

TABLE 13.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from diphtheria, in Michigan in 1902, and during the 9 years, 1893-1901, also the average age and the number of cases included. Compiled from such reports as stated the ages.*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Per cent of non-fatal cases in each period of age.											
				All ages.	Under five years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males.....	10.9	822	100	19.4	38.7	18.6	10.2	5.7	2.4	1.9	.5	1.6	.4	.5
	Females..	12.9	961	100	15.0	33.5	21.7	9.8	6.8	4.7	3.0	2.5	1.6	.8	.6
1893-1901.	Males.....	10.8	7,367	100	22.6	35.0	20.4	9.1	4.4	3.1	2.2	1.5	.9	.5	.4
	Females..	13.1	8,754	100	17.1	30.4	21.2	10.2	6.6	4.6	3.8	2.6	1.6	.8	1.1

Average duration of sickness.—The average duration of sickness from reported diphtheria in 1902 was shorter than for the nine year period, 1893-1901. For males, 7.3 days and for females 6.5 days in 1902, while for the nine years it was about twelve days for both sexes in fatal cases. In non-fatal cases, in 1902, the duration was about eleven and one-half days for both sexes, and for the nine years, about thirteen and one-half days. (Tables 14 and 15.)

TABLE 14.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from diphtheria, in Michigan, during the year 1902, and in the 9 years, 1893-1901. Per cent of deaths arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

Fatal cases of diphtheria.												
Year.	Sex.	Average duration of fatal cases.	No. of fatal cases included.	Duration of sickness.—Per cent of deaths in each period of days.								
				All cases.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1902.	Males.....	7.3	143	100	54	30	8	2	1	0	3	1
	Females..	6.5	110	100	52	30	15	0	3	0	0	1
1893-1901.	Males.....	11.9	5,615	100	22	32	21	11	8	3	1	2
	Females..	12.0	6,634	100	21	33	21	12	8	3	1	2

TABLE 15.—*Exhibiting, by sex of patient, the duration (in days) of non-fatal cases of sickness from diphtheria, in Michigan, during 1902, and the 9 years, 1893-1901. Per cent of non-fatal cases arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

Non-fatal cases of diphtheria.												
Year.	Sex.	Average duration of non-fatal cases.	No. of cases included.	Duration of sickness.—Per cent of non-fatal cases in each period of days.								
				All periods.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25	26 to 30.	31 to 35.	36 and over.
1902.	Males.....	11.3	691	100	18	41	19	10	8	2	1	1
	Females..	11.5	851	100	18	38	22	11	4	2	2	2
1893-1901.	Males.....	13.4	4,796	100	12	34	23	13	10	4	2	3
	Females..	13.5	5,750	100	11	34	23	14	10	4	2	2

WHOOPING-COUGH IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1902.

During the year ending December 31, 1902, there were reported to the Secretary of the State Board of Health, 346 outbreaks of whooping-cough in 327 localities in Michigan, which resulted in 3,534 cases,* including 222 deaths.

Excluding Jackson, from which only the seven fatal cases were reported, and Detroit, from which only the thirty-eight fatal cases were reported, the average number of cases per locality, in 1902, was 10.74. The average number of deaths per locality was .68 of one death. Excluding Jackson and Detroit, the fatality from this disease, i. e., the proportion of cases which proved fatal, was 5.07 per cent, or about five deaths to 100 cases. If the fatality in Jackson and Detroit was the same as in the other parts of the State, the number of cases in these cities was 888; which if added to the 3,489 cases, the number of reported cases in the State exclusive of the forty-five fatal cases in Jackson and Detroit, would have made 4,377 cases.

The death-rate from this disease for the State, according to the reports to this office, was 8.9 of one death per 100,000 inhabitants.

Whooping-cough in 1902 compared with previous years.—Table 1 shows that in 1902, as compared with the averages for the fifteen years, 1887-1901, the number of reported cases was 98 less and the reported deaths 112 more. The increase in the reported number of deaths may not indicate a greater fatality from this disease in 1902, but only that the fatal cases are being more frequently and carefully reported. There are still cases of whooping-cough in other parts of Michigan than Detroit and Jackson which are not reported; in many instances the fatal cases, only, are reported and even not all fatal cases are yet reported to this office, as shown by the fact that for the year 1902 there were reported to the Secretary of State 290 deaths from whooping-cough, while only 222 were reported to the Secretary of the State Board of Health.

So far as relates to deaths, whooping-cough is of far greater importance to the people of Michigan than smallpox is, yet the reporting of the disease cannot be enforced because of the imperfect law on the subject. The legislature has been repeatedly asked to so amend the law as to have some competent authority decide what diseases are "dangerous to the public health" and therefore required to be reported; but thus far the old imperfect law continues, and the diseases most dangerous to the public health cannot be restricted because they are not reported to the health officials.

Table 1, and comments thereon are based upon reports to the office of the State Board of Health. Exhibit 1, and comments thereon are based upon returns of deaths, made to the Secretary of State. For all years preceding 1898 the statistics of deaths were collected after the close of the year in which they occurred, and it is believed that not all deaths were reported; for all years after 1897 the deaths were recorded before burial, and returns were made to the Secretary of State early in the following month. There is reason to believe that under the new law nearly all deaths are included in the statistics, whereas before 1898 a considerable proportion was omitted. This fact should be held in mind in comparing the deaths reported for the year 1902 with those reported in years previous to 1898, also in comparing the death-rate of 1898, 1899, 1901 and of 1902 with that for preceding years.

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* Throughout this article "cases" include deaths unless the word non-fatal is used.

TABLE 1.—*Whooping-cough in Michigan in 1902, and the total and average for the 15 years 1887-1901. Exhibiting the numbers of reported cases and deaths and the number of localities in which the presence of the disease was reported, together with the cases and deaths per locality and per 100,000 inhabitants, and the per cent the deaths were of cases. Compiled from reports received at the office of the Secretary of the State Board of Health.*

Year.	Cases.	Deaths.	Localities.	Cases per locality.	Deaths per locality.	Cases per 100,000 inhabitants.	Deaths per 100,000 inhabitants.	Per cent deaths were of cases.
1902......	*3,534	222	327	†10.74	.68	†162.0	8.9	†5.07
Totals, 1887-1901	54,481	1,654	3,235	....	....	....	....	....
Av. for 15 years....	3,632	110	216	16.84	.51	163	5.0	3.04

* In numerous instances only the fatal cases were reported to this office.
† Exclusive of Jackson, from which only the seven fatal cases were reported, and of Detroit, from which only the thirty-eight fatal cases were reported.

EXHIBIT 1.—*Exhibiting the reported number of deaths from whooping-cough per 100,000 persons living in Michigan in each of the 34 years, 1869-1902. Compiled from the Secretary of State's Vital Statistics of Michigan. Population estimated by average annual increase.*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
Deaths (per 100,000, etc.).	13.9	10.1	5.5	15.1	15.6	11.2	7.2	12.4	8.7	8.5	10.2	16.1	8.4	5.0
Year	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Deaths (per 100,000, etc.).	5.2	8.8	7.4	9.7	5.6	8.7	6.8	3.6	7.4	6.7	7.8	7.0	6.1	6.8
Year.	1897.	1898.	1899.	1900.	1901.	1902.								
Deaths (per 100,000, etc.).	4.5	12.0	10.0	8.6	6.4	11.8								

The statement of the death-rate for 1902 is based upon the ephemeral publication, the Bulletin of Vital Statistics; the final compilation of whooping-cough by the State Department Division of Vital Statistics in

1902 has not yet been completed, so that the death-rate stated may be changed later, because where two diseases are mentioned as causing death, as not infrequently occurs, not always the same one is used in the final compilation as in the Bulletin of Vital Statistics. It is believed that the death-rate shown in Table 2 (8.9) is probably nearly correct.

Distribution of whooping-cough by counties in Michigan during 1902.—Table 2 exhibits the distribution of whooping-cough by counties in this State during the year 1902, according to the reports made to the Secretary of the State Board of Health. The table shows the reported numbers of cases and deaths, also the sickness and death-rates from whooping-cough in each county from which the disease was reported.

Sickness and death-rates from reported whooping-cough.—Table 2 shows that the sickness-rate for the State, in 1902, was 162.0 cases per 100,000 population. This rate is exclusive of Detroit, from which only the thirty-eight fatal cases were reported,—with a population of 301,673, and of Jackson, from which only the seven fatal cases were reported,—with a population of 26,035. The population of these cities used in this table was estimated for 1902 by the Department of State.

The highest sickness-rate, by counties, was in Hillsdale county, where the rate was 817.4 cases per 100,000 population.

The lowest sickness-rate, by counties, 11.1 cases per 100,000 population, was in Kent county. Gogebic county, having a sickness-rate of 11.3 cases per 100,000 population, and Ionia county, 11.7 cases per 100,000 population, had the next lowest sickness-rates.

Table 2 also shows that the death-rate for the State in 1902 was 8.9 deaths per 100,000 population. The highest death-rate, by counties, was in Baraga county, 69.0 deaths per 100,000 population.

From nineteen counties from which sickness from whooping-cough was reported there were no deaths reported from this disease. The lowest death-rate, from counties from which deaths were reported, was in Washtenaw county, 2.0 deaths per 100,000 population. Marquette and Ingham counties, having death-rates of 2.4 and 2.5 deaths per 100,000 population, were next lowest.

Whooping-cough in each month of the year, 1902.—From Table 3 it appears that the prevalence of whooping-cough is quite uniform throughout the year. A study of Table 14, of the article on "Sickness Statistics" in this report, shows that whooping-cough, according to the weekly card-reports made to this office, during the ten years, 1893-1902, varied but little in the different months; the *lowest* monthly average of reports which stated the presence of whooping-cough was 5 per cent of all reports received, while the *highest* monthly average was only 8 per cent. The general monthly average for the ten years was 7 per cent.

The first line in Exhibit 2 shows the number of localities in Michigan at which whooping-cough was reported present in each month of the year 1902. The second line shows the per cent these localities were of the number of infected localities in which the month or months in which the disease was present, was stated.

The third line shows the number of cases present in each month of the year; and the fourth line shows the per cent the cases present in each month were of all cases concerning which this information was stated. There were 1,679 cases of which the month or months in which they were present were not reported.

TABLE 2.—*Number of cases and deaths reported from whooping-cough per 100,000 persons living in each county in Michigan during the year 1902. Compiled from reports of health officers.*

State and Counties.	Population of Michigan for 1902.*	Number of reported		Number per 100,000 population of		Counties.	Population of Michigan for 1902.	Number of reported		Number per 100,000 population of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,480,762	†3,534	222	†162.0	8.9	Keweenaw	3,353	0	0	0	0
						Lake	4,643	20	0	430.8	0
Alcona	5,781	0	0	0	0	Lapeer	27,229	39	3	143.2	11.0
Alger	7,358	5	0	68.0	0	Leelanau	10,882	3	3	27.6	27.6
Allegan	38,686	32	0	82.8	0	Lenawee	48,360	111	4	229.5	8.3
Alpena	18,432	0	0	0	0	Livingston	19,406	45	1	231.9	5.2
Antrim	17,944	17	1	94.7	5.6	Luce	3,193	0	0	0	0
Arenac	10,779	2	0	18.6	0	Mackinac	7,857	0	0	0	0
Baraga	4,350	3	3	69.0	69.0	Macomb	33,528	127	5	378.8	14.9
Barry	22,118	155	0	700.8	0	Manistee	28,434	53	5	186.4	17.6
Bay	62,734	8	8	12.8	12.8	Marquette	42,313	12	1	28.3	2.4
Benzie	10,221	4	1	39.1	9.8	Mason	19,037	6	5	31.5	26.3
Berrien	50,339	117	5	232.4	9.9	Mecosta	20,681	0	0	0	0
Branch	28,343	61	5	215.2	17.6	Menominee	28,144	30	1	106.6	3.6
Calhoun	49,927	42	2	84.1	4.0	Midland	14,845	23	1	154.9	6.7
Cass	20,776	53	2	255.1	9.6	Missaukee	10,088	7	0	69.4	0
Charlevoix	14,718	5	1	34.0	6.8	Monroe	32,612	25	8	76.7	24.5
Cheboygan	16,144	9	1	55.8	6.2	Montcalm	32,286	19	0	58.8	0
Chippewa	23,338	10	2	42.8	8.6	Montmorency	3,498	0	0	0	0
Clare	8,486	43	1	50.6	11.8	Muskegon	36,980	19	0	51.4	0
Clinton	24,760	38	1	153.5	4.0	Newaygo	17,189	28	1	162.8	5.8
Crawford	3,019	1	1	33.1	33.1	Oakland	45,496	141	6	309.9	13.2
Delta	25,417	11	1	43.3	3.9	Oceana	16,658	97	1	582.3	6.0
Dickinson	18,932	10	1	52.8	5.3	Ogemaw	8,473	7	1	82.6	11.8
Eaton	31,352	12	0	38.3	0	Ontonagon	5,971	1	1	16.7	16.7
Emmet	17,777	13	2	73.1	11.3	Osceola	18,319	14	0	76.4	0
Genesee	42,220	55	7	130.2	16.6	Oscoda	1,356	0	0	0	0
Gladwin	7,116	3	2	42.2	28.1	Otsego	6,633	2	1	30.2	15.1
Gogebic	17,622	2	2	11.3	11.3	Ottawa	39,859	47	4	117.9	10.0
Gd. Traverse	21,465	54	2	251.6	9.3	Presque Isle	9,787	14	2	143.0	20.4
Gratiot	30,259	22	2	72.7	6.6	Roscommon	1,829	0	0	0	0
Hillsdale	29,729	243	0	817.4	0	Saginaw	81,014	72	10	88.9	12.3
Houghton	73,353	148	4	201.5	5.5	Sanilac	35,423	107	5	302.1	14.1
Huron	34,796	232	12	666.7	34.5	Schoolcraft	8,141	3	0	36.8	0
Ingham	39,860	51	1	127.9	2.5	Shiawassee	34,202	62	3	181.3	8.8
Ionia	34,165	4	0	11.7	0	St. Clair	55,528	184	10	331.4	18.0
Iosco	9,548	25	0	261.8	0						
						St. Joseph	23,489	7	1	29.8	4.3
Iron	10,220	4	0	39.1	0	Tuscola	36,380	188	4	516.8	11.0
Isabella	23,230	11	4	47.4	17.2						
Jackson	48,782	‡ 44	7	‡ 162.7	14.3	Van Buren	34,008	16	0	47.0	0
						Washtenaw	49,177	120	1	244.0	2.0
Kalamazoo	45,060	30	0	66.6	0						
Kalkaska	7,629	4	0	52.4	0	Wayne	367,565	§ 135	49	§ 147.2	13.3
Kent	132,302	147	4	11.1	3.0	Wexford	17,775	20	0	112.5	0

* Population estimated by average annual increase.
† Exclusive of Jackson and Detroit, from which only the forty-five fatal cases were reported.
‡ Exclusive of Jackson, from which only the seven fatal cases were reported.
§ Exclusive of Detroit, from which only the thirty-eight fatal cases were reported.

The fifth line of the exhibit shows the number of cases taken sick each month; and the last line shows the per cent the cases taken sick in each month were of the total number of these cases. There were 1,837 cases of which the months in which they were taken sick were not reported.

TABLE 3.—*Exhibiting the reported number of outbreaks of whooping-cough which were present, in each month of the year 1902, in the different local jurisdictions of Michigan.*

Months	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Outbreaks present	47	51	62	58	70	80	73	77	65	56	65	61

EXHIBIT 2.—*Exhibiting the number and per cent of localities infected with whooping-cough, and the number and per cent of cases of whooping-cough present, and the number and per cent of cases taken sick, in Michigan, in each month during the year 1902.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of localities	* 282	47	51	62	58	70	80	72	76	65	56	65	61
Per cent of localities	....	16.6	18.1	22.0	20.6	24.8	28.4	25.5	27.0	23.0	19.9	23.0	21.6
Number of cases present	† 1,855	200	188	176	210	219	303	269	306	234	188	273	363
Per cent of cases present	....	10.8	10.1	9.5	11.3	11.8	16.3	14.5	16.5	12.6	10.1	14.7	19.6
Number of cases taken sick	‡ 1,697	183	72	88	140	137	202	150	157	101	128	156	183
Per cent of cases taken sick	100	10.8	4.2	5.2	8.2	8.1	11.9	8.8	9.3	6.0	7.5	9.2	10.8

* Total number of localities reported infected with whooping-cough in 1902, was 327.

† There were 3,534 cases of whooping-cough reported in 1902; in 1,855 of these cases the month or months in which they were present were reported, leaving 1,679 cases of which this information was not stated.

‡ Of the 3,534 cases of whooping-cough reported in 1902, the months in which they were taken sick were reported in 1,697 instances.

EXHIBIT 3.—*The number of deaths from whooping-cough in each month of the year 1902, and the per cent the deaths in each month were of all the deaths from whooping-cough in 1902, reported to the office of the State Board of Health.*

Months	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.	Year.
Number of deaths.	13	13	21	15	21	27	23	23	18	7	21	20	222
Per cent of deaths	5.9	5.9	9.5	6.8	9.5	12.2	10.4	10.4	8.1	3.2	9.5	9.0	....

Exhibit 3 shows that the greatest number of deaths from whooping-cough occurred during the summer months, the largest number of deaths reported for any one month, 27, having occurred in June and the next largest number, in July and August,—23 in each month. The month for which the least number of deaths was reported was October, there being only seven deaths reported as having occurred in that month.

Source of contagium of whooping-cough and how the disease is spread. —Of the 3,534 cases of whooping-cough reported, during the year 1902, as exhibited in Table 4, the local health officers reported the source of contagium as follows: Traced to a former case, 449; from outside jurisdiction, 37; probably from outside jurisdiction, 4; unknown, 1,901; not stated or indefinitely reported, 1,143; total, 3,534.

TABLE 4.—*Reported source of contagium of cases of whooping-cough, in 1902.*

Traced to a former case	449
Contagium reported as from outside jurisdiction	37
Contagium reported as probably from outside jurisdiction	4
Unknown or reports not definite (includes those reported "Contagium," "Sporadic," "Spontaneous," "*De Novo*," etc.)	1,901
Not stated (including cases reported by registrars to Secretary of State and not reported to this office)	1,143
All cases	3,534

Outbreaks of whooping-cough reported traced to previous outbreaks.—According to reports of local health officers in Michigan the contagium of whooping-cough in forty-four outbreaks, with an aggregate of 340 cases, including thirteen deaths, was traced to outside jurisdictions. From two of these second localities the contagium was permitted to spread to other localities resulting in twenty-six cases, including two deaths. Five outbreaks were reported as *probably* traced to preceding outbreaks.

Seven outbreaks, with an aggregate of one hundred and thirty-six cases, including one death, were traced to places outside of Michigan.

Transgression of the public health laws.—Strict isolation and disinfection enforced in the 318 outbreaks of whooping-cough would have lessened to a considerable degree the number of cases and deaths from the disease in 1902, and the carelessness on the part of the people generally approaches criminality. Such carelessness must be due to ignorance of the importance of the disease, for whooping-cough, for the past eight years, has caused more deaths in Michigan than either scarlet fever or measles,* and when this information has become sufficiently familiar to the people of the State, and the vital necessity of the isolation and disinfection of the disease is fully understood, then coöperation may be expected, and a diminution of the number of cases and deaths from whooping-cough may be expected.

The following quotations from reports of local health officers show some of the difficulties experienced by health officers in restricting this disease:—

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*According to the returns made to the Secretary of State.

"Whooping-cough is prevalent, but there has never been a single case of it reported by any physician to the health officer."—*O. B. Campbell, health officer, Ovid village, Clinton Co.*

"There are hundreds of cases of whooping-cough in the county but the people care nothing about it. It is safe to say that in the cases you inquire about, nothing was done."—*S. J. Henderson, health officer, Colfax township, Huron Co.*

"If you desire reports of cases of whooping-cough you will have to provide some way to compel householders to report, or establish a police inspection throughout the country, as these cases are rarely reported or seen by physicians until dangerous complications supervene." —*W. H. Strong, M. D., Byron Centre, Kent Co.*

"In spite of health board and physicians, the public as individuals will scout the idea of whooping-cough being anything more than a cold, or when obliged to admit the diagnosis, will treat the matter lightly, as something inevitable, neglect to call a physician, and many times show little regard for others by allowing their children to mingle with other children."—*Grant G. Speer, M. D., Manistee city, Manistee Co.*

While some of the localities in the State, and a portion of the people, are in sympathy with the modern sanitary thought and the restriction of this disease, and while the conditions shown in the above quotations do not exist in every locality, still reports from various parts of the State show similar difficulties met by local health officers and physicians in restricting this disease.

Table 5 shows that of 318 outbreaks, in 163 of them isolation and disinfection were either not mentioned or the statements were so doubtful as to be impossible of classification; a majority of them were probably neglected; in six outbreaks disinfection was enforced and isolation was doubtful; in eight outbreaks, isolation was enforced; but disinfection was doubtful; in nineteen outbreaks disinfection was enforced and isolation was neglected; in nine outbreaks isolation was enforced and disinfection was neglected; in one hundred outbreaks isolation and disinfection were both neglected, and out of the 318 outbreaks reported, only fourteen were reported as enforced. The results of the different modes of action are shown in Table 5.

Estimated number of outbreaks and cases of whooping-cough prevented and lives saved by isolation and disinfection.—Comparisons are made in Table 5, of the average numbers of cases and deaths in outbreaks of whooping-cough where the measures of isolation and disinfection prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in outbreaks where these measures were neglected.[*]

By this table (5) it may be seen that during the year 1902 there were reported to the office of the State Board of Health 318[†] outbreaks of whooping-cough, with 3,326 cases, including 152 deaths. Had no efforts at restriction been made, and had the average number of cases and deaths

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[*] In the compilation of the reports for Table 5 showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed, "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned; or statements doubtful."

[†] Whenever a break of sixty days or more has occurred in the progress of a communicable disease in a given township, village or city it has been regarded as two different outbreaks, but if the second appearance of the disease could be traced from the first the intermission was disregarded and it was treated as a single outbreak. Also, comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks*, even where they extend from one year into the next. This explains the apparent discrepancy between the number of outbreaks here given and the number given at the beginning of this article.

TABLE 5.—WHOOPING-COUGH IN MICHIGAN IN 1902. *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 318 outbreaks reported; (2) in the 163 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 6 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 8 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 19 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 9 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 100 outbreaks in which isolation and disinfection were both neglected; (8) in the 14 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (318 outbreaks.)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (163 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (6 outbreaks.)		(4) Isolation enforced - disinfection doubtful. (8 outbreaks.)		(5) Disinfection enforced—isolation neglected. (19 outbreaks.)		(6) Isolation enforced—disinfection neglected. (9 outbreaks.		(7) Isolation and disinfection both neglected. (100 outbreaks.)		(8) Isolation and disinfection both enforced. (14 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals..........	3,326	152	1,529	65	33	2	20	3	117	13	17	0	1,497	63	113	6
Averages......	10.46	.48	9.38	.40	5.5	.33	2.5	.37	6.16	.68	1.89	0	14.97	.63	8.07	.43

per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 4,760 cases, including 200 deaths. Had the average numbers of cases and deaths in all outbreaks been the same as those in the column headed "Isolation and disinfection both enforced," there would have occurred only 2,566 cases, including 137 deaths, or 760 cases of sickness, including 15 deaths, from whooping-cough would have been prevented.

TABLE 6.—*Exhibiting for the five years, 1897-1901, and for the year 1902, the reported period of incubation in days, in cases of whooping-cough in Michigan. Compiled from reports of health officers in Michigan.*

Incubation period—days	3	6	7	8	9	10	11	12	14	15	18	20	21	28	30
Instances* in each day, for five years, 1897-1902	1	1	10	5	17	30	4	4	40	2	0	3	6	2	2
Instances* in each day, for the year 1902	0	0	4	1	6	5	0	0	10	0	1	0	1	1	0

*In many of these instances it was reported as *about* the number of days stated.

TABLE 7.—*Exhibiting in certain age-groups, the numbers of cases and deaths from whooping-cough, the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of all the cases in that group. Compiled from all reports for the year 1902, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.*																
Ages in groups of years.	All known ages.	0-1.	1-2.	2-3.	3-4.	4-5.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50 and over.
No. of cases†	846	175	104	71	61	64	475	265	78	16	7	1	1	2	0	0	1
Per cent the cases in each group were of all cases of known ages	......	21	12	8	7	8	56	31	9	2	8	1	1	2	0	0	1
No. of deaths	211	131	51	12	8	3	205	5	0	1	0	0	0	0	0	0	0
Per cent the deaths in each group were of all cases in that group	25	75	49	17	13	5	43	2	0	6	0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths, known ages	.....	62	24	6	4	1	97	2	0	.5	0	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths, known ages.	......	97					99.5		.5								

*In dividing the ages into five-year periods, the first period includes all ages from birth to five years, or all under five years of age. The second five-year period includes all ages of five years and over and less than ten years. In each succeeding period the same arrangements is followed.

† Includes deaths from this disease."

Incubation period in whooping-cough.—By Table 6 it may be seen that for five years, 1897-1901, the period of incubation in whooping-cough was reported in the greatest number of instances as fourteen days (forty instances), and the incubation period reported in the next greatest number of instances was ten days, in thirty instances. Fourteen days were also reported in the most instances in 1902. The total number of instances in which the period of incubation was reported in days was for the five years, 127, and for the year 1902 it was reported in twenty-nine instances. The average reported period of incubation for the five years was 12.3 days, and for the year 1902 it was twelve days.

Ages of fatal and non-fatal cases of whooping-cough.—From Table 7 it may be seen that eighty-seven per cent of all the sickness, and ninety-nine and five-tenths per cent of all the deaths from whooping-cough occurred in children under ten years of age; that the fatality from this disease was greatest in children under one year old—seventy-five per cent of the reported cases of that age having proved fatal; and, also, that sixty-two per cent of all deaths from this disease were in children under one year old.

TABLE 8.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from whooping-cough, in Michigan, during the year 1902; also the average age and number of cases included. Compiled from such reports as stated the ages.*

Year.	Sex.	Average age of persons who recovered, years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period.*										
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 and over.
1902.	Males	5.7	307	100	43	44	10	3	1	0	0	0	0	.3
	Females	6.2	328	100	42	38	14	2	2	.3	.3	1	0	0

*A foot-note to Table 7 explains these age-groups.

Table 9 shows that all but one per cent of the reported deaths from whooping-cough, in which the ages were stated, were in children under ten years of age. Ninety-nine per cent of the males and ninety-six per cent of the females were under five years.

TABLE 9.—*Exhibiting, by sex, the per cent of persons in certain age-groups who died of whooping-cough during the year 1902.*

Year.	Sex.	Average age of decedents.	No. of deaths included.	Per cent of deaths in certain age-groups.*					
				All ages.	Under 5.	5 to 9.	10 to 24.	25 to 39.	40 to 44.
1902.	Males	.8	90	100	99	1	0	0	0
	Females	1.3	121	100	96	3	1	0	0

* A foot-note to Table 7 explains these age groups.

The average age of non-fatal cases of whooping-cough in 1902 was 5.7 years for males and 6.2 for females; for fatal cases the average age was .8 years for males and 1.3 years for females.

Duration of sickness from whooping-cough.—The duration of sickness from whooping-cough was given in 469 cases that recovered from this disease and in 95 fatal cases. Table 11 shows that the greatest per cent of non-fatal cases were sick from thirty-one to thirty-five days.

The average duration of non-fatal cases was 42.0 days for males and 41.0 days for females; for fatal cases the average duration was 19.5 days for males and 22.1 days for females.

The lesson of the experience may well be summed up in the constant warning advanced and persisted in by the State Board of Health,—"Prevent the disease by isolation of the first cases, disinfect the sick room and all that comes in contact with the patient," and the number of cases will be lessened, the deaths from whooping-cough will be diminished.

TABLE 10.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from whooping-cough, in Michigan, during the year 1902. Per cent of deaths arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

Fatal cases of whooping-cough.												
Year.	Sex.	Average duration.	No. of deaths included.	Duration of sickness:—Per cent of deaths in each period of days.								
				All periods.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1902.	Males	19.5	44	100	14	18	20	14	5	14	2	14
	Females	22.1	51	100	10	18	22	2	22	6	4	18

TABLE 11.—*Exhibiting, by sex of patient, the duration (in days) of non-fatal cases of sickness from whooping-cough, in Michigan, during the year 1902. Per cent of cases arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

Non-fatal cases of whooping-cough.																		
Year.	Sex.	Average duration.	No. of cases included.	Duration of sickness:—Per cent of cases in each period of days.														
				All periods.	1 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 to 60.	61 to 65.	66 to 70.	71 to 75.	76 and over.
1902.	Males	42.0	221	100	4	10	5	11	14	8	8	8	4	5	6	5	2	8
	Females	41.0	248	100	9	7	5	9	15	9	5	4	9	5	6	4	2	6

MEASLES IN MICHIGAN.—DURING THE YEAR ENDING DECEMBER 31, 1902.

There were reported by local health officers to the Secretary of the State Board of Health, in all 702 outbreaks of measles, in 546 local jurisdictions, as having occurred in Michigan during the year 1902; and in these outbreaks there were reported to have occurred 11,978 cases,* including 162 deaths.

The office of the State Board of Health is making constant efforts to get local health officials, and the people generally, to take measures to prevent the spread of measles, and to make reports to the local health officers and they to the Secretary of the State Board of Health; concerning that disease in the several localities; but it is probable that a large number of cases are not yet reported. From Detroit, for instance, forty-four fatal cases only were reported. Other localities from which fatal cases only were reported are given below and on a subsequent page of this article.

MEASLES IN 1902, COMPARED WITH PREVIOUS YEARS.

Under the present law, all deaths are reported to the Secretary of State, therefore this comparison may well take account of the reports to that officer as well as to this office.

According to reports made to the Secretary of the State Board of Health.—Compared with 1901, Table 1 shows an increase of 342 outbreaks, 7,349 cases,* 100 deaths, and an increase of 4.2 cases, and .06 of one death, per outbreak.

The fatality for the State in 1902, excluding Bay City, Sault Ste. Marie, Detroit, and Cedar Creek township, Wexford county, from where only fatal cases were reported, was .9 of one death per 100 cases, a decrease of .2 of one death per 100 cases from the fatality in 1901, excluding the localities (Detroit and Baraga village) in that year from which fatal cases only were reported.

Compared with the averages for the twelve years, 1890-1901, there was an increase of 224 outbreaks and 37 deaths, but a decrease of 209 cases; also a decrease of 8.4 cases, and .03 of one death, per outbreak. The fatality apparent for 1902 increased .4 of one death per 100 cases.

According to reports made to the Secretary of State.—Table 2 is based upon returns of deaths made to the Secretary of State. For all years preceding 1898 the statistics of deaths were collected after the close of the year in which they occurred; for all years after 1897 the deaths were recorded before burial, and returns were made to the Secretary of State early in the following month. There is reason to believe that under the new law very nearly all deaths are included in the statistics, whereas before 1898 a considerable proportion was omitted. This fact should be held in mind in comparing the deaths reported for the year 1902 with those reported in years previous to 1898. The death-rate for the year 1902 (9.3) is that stated in the Bulletin of Vital Statistics. The rates computed for previous years have been made from the *final* compilation of deaths from measles made by the Department of Vital Statistics. The final compilation for 1902 has not been made, consequently this rate (9.3), may not be quite accurate, because where two diseases are mentioned as causing a death, as not infrequently occurs, not always the same one is used in the final compilation as in the Bulletin of Vital Statistics.

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*Throughout this article "cases" include both fatal and non-fatal cases.

TABLE 1.—*Exhibiting the numbers of outbreaks, cases and deaths from measles, the number of localities in which they occurred, the average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal, for the years 1901 and 1902, and the averages for the 12 years, 1890-1901; with the departures of the same for 1902, from 1901 and from the average of the same for the 12 years, 1890-1901.*

Year.	Reported outbreaks.	Reported localities.	Reported cases.	Av.No. of cases per outbreak.	Reported deaths.	Av.No. of deaths per outbreak.	Deatns per 100 cases.
1901....................	360	302	4,629	12.9	62	.17	1.3
1902....................	702	546	11,978	17.1	162	.23	1.4
Departure of 1902 from 1901...........	+342	+243	+7,349	+4.2	+100	+.06	+.1
Average for 12 years, 1890-1901.............	478	412	12,187	25.5	125	.26	1.0
Departures of 1902 from the averages for 12 years, 1890-1901	+224	+136	—209	—8.4	+37	—.03	+ .4

TABLE 2.—*Exhibiting the reported number of deaths from measles per 100,000 persons living in Michigan in each of the 35 years, 1868-1902. Compiled from the Secretary of State's Vital Statistics of Michigan. Population for intercensal years estimated by average annual increase based on National and State Censuses.*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Deaths (per 100,000, etc.)	8.66	12.88	4.72	5.45	14.12	18.56	3.37	9.50	8.10	4.13	1.03	10.49	7.63	15.21

Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Deaths, etc...	8.68	14.54	7.91	2.04	6.75	14.56	20.62	5.08	10.94	10.51	3.29	5.76	3.75	1.93	5.22

Year.	1897.	1898.	1899.	1900.	1901.	1902.
Deaths, etc...	8.2	5.6	7.8	14.1	3.0	9 3

Sickness rates from reported measles.—In comparing sickness-rates it should be borne in mind that many cases of sickness from measles are not reported, and that it is probable that the omissions are greater in some parts of the State than in others. In Detroit only the forty-four fatal cases were reported. (If the ratio of deaths to cases was the same there as in other parts of the State, .9 of one death per 100 cases, the cases of measles in Detroit were 4,889.)

Also from the following places only fatal cases were reported: Bay City, one fatal case, Sault Ste. Marie, and Cedar Creek township, Wexford county, each three fatal cases, and from each of nineteen other localities one fatal case only was reported. In but one of these nineteen outbreaks were restrictive measures reported thoroughly enforced. This would suggest that there were other cases of sickness from measles in these localities and only the fatal cases reported. Other reports from local health officers show that not all cases of sickness from measles are reported.

The sickness-rate from reported measles for the State, excluding Bay City, Sault Ste. Marie, Detroit and Cedar Creek township, where none but fatal cases were reported, was 557.4 cases per 100,000 population. By counties, the highest sickness-rate was in Keweenaw county,—2,803.2 cases per 100,000 population. The sickness-rate in Keweenaw was over five times the average rate for the State. The counties of Barry, Luce, Ontonagon, Ottawa, Eaton and Houghton, had the next highest rates. The sickness-rate in Houghton county, the lowest of these rates, was nearly three times the average rate. The lowest sickness-rate, in counties from which sickness from measles was reported, was in Manistee county, where the rate was 3.5 cases per 100,000 population. No sickness from this disease was reported from the counties of Alcona, Baraga, Charlevoix, Leelanau, Oscoda, and Otsego.

Death-rates from reported measles.—The death-rate from reported measles for the State in 1902 was 6.5 deaths per 100,000 population. The highest death-rate by counties, was in Keweenaw county,—29.8 deaths per 100,000 population, over four times the average death-rate for the State. The lowest death-rate, in counties from which deaths from measles were reported, was in Bay county,—1.6 deaths per 100,000 population.

Fatality, or "case-mortality," by counties from reported measles.—The fatality from reported measles in 1902, i. e., the proportion of reported cases which proved fatal, for the whole State, exclusive of Bay City, Sault Ste. Marie, Detroit and Cedar Creek township, where none but fatal cases were reported, was .9 of one death per 100 cases. By counties, exclusive of the counties in which these localities are situated, the maximum fatality occurred in Oceana county, where there were twenty deaths per 100 cases reported. The minimum fatality, in counties from which deaths from measles were reported, was in Berrien and Eaton counties, each of which had a fatality of .4 of one death per 100 cases. There were thirty-two counties from which sickness from measles was reported from which there were no deaths from this disease.

Distribution of reported measles in cities, villages and townships.—From the data in Table 4 it may be observed that 81.3 per cent of the cities, 37.1 per cent of the villages, and 30.1 per cent of the townships, were infected with measles in 1902. But the average population of the cities is nearly fourteen times the average population of the villages.* The highest case-rate (864.0 cases per 100,000 population) and death-rate (8.6 deaths per 100,000 population) occurred in the cities. The greatest

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*The average estimated population of the cities in 1902 was 12,255, of the villages, 887, and of the townships, 1,011.

TABLE 3.—*Numbers of cases and deaths reported from measles, and the cases and deaths per 100,000 persons living in each county in Michigan during the year 1902.*

State and counties.	Estimated population of Michigan for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.	Deaths.	Cases.	Deaths
State	2,480,762	11,978	162	†557.4	6.5
Alcona	5,781	0	0	0	0
Alger	7,358	64	1	869.8	13.6
Allegan	36,686	296	0	765.1	0
Alpena	18,432	21	0	113.9	0
Antrim	17,944	4	0	22.3	0
Arenac	10,779	1	0	9.3	0
Baraga	4,350	0	0	0	0
Barry	22,118	501	4	2,265.1	18.1
Bay	62,734	55	1	‡150.4	1.6
Benzie	10,221	11	1	107.6	9.8
Berrien	50,339	494	2	981.3	4.0
Branch	28,343	56	3	197.6	10.6
Calhoun	49,927	616	4	1,233.8	8.0
Cass	20,776	22	1	105.9	4.8
Charlevoix	14,718	0	0	0	0
Cheboygan	16,144	9	0	55.7	0
Chippewa	23,338	31	3	‡239.8	12.9
Clare	8,486	7	1	82.5	11.8
Clinton	24,760	22	1	88.9	4.0
Crawford	3,019	1	0	33.1	0
Delta	25,417	175	6	688.5	23.6
Dickinson	18,932	19	3	100.4	15.8
Eaton	31,352	499	2	1,591.6	6.4
Emmett	17,777	4	0	22.5	0
Genesee	42,220	229	2	542.4	4.7
Gladwin	7,116	1	0	14.1	0
Gogebic	17,622	3	0	17.0	0
Gd. Traverse	21,465	9	0	41.9	0
Gratiot	30,259	126	3	416.4	9.9
Hillsdale	29,729	26	0	87.5	0
Houghton	73,353	1,107	6	1,509.1	8.2
Huron	34,796	30	1	86.2	2.9
Ingham	39,860	465	7	1,166.6	17.6
Ionia	34,165	165	1	483.0	2.9
Iosco	9,548	10	0	104.7	0
Iron	10,220	11	0	107.6	0
Isabella	23,230	125	2	538.1	8.6
Jackson	48,782	467	2	957.3	4.1
Kalamazoo	45,060	570	3	1,265.0	6.7
Kalkaska	7,629	13	0	170.4	0
Kent	132,302	528	3	399.1	2.3
Keweenaw	3,353	94	1	2,803.2	29.8
Lake	4,643	11	0	236.9	0
Lapeer	27,229	169	4	620.7	14.7
Leelanau	10,882	0	0	0	0
Lenawee	48,360	205	0	423.9	0
Livingston	19,406	88	0	453.5	0
Luce	3,193	64	0	2,004.4	0
Mackinac	7,857	6	0	76.4	0
Macomb	33,528	283	4	844.1	11.9
Manistee	28,434	1	0	3.5	0
Marquette	42,313	368	3	869.7	7.1
Mason	19,037	212	1	1,113.6	5.3
Mecosta	20,681	33	0	159.6	0
Menominee	28,144	97	2	344.7	7.1
Midland	14,845	75	0	505.2	0
Missaukee	10,088	10	1	99.1	9.9
Monroe	32,612	37	2	110.4	6.1
Montcalm	32,286	60	1	185.8	3.1
Montmorency	3,498	1	0	28.6	0
Muskegon	36,980	29	0	78.4	0
Newaygo	17,189	21	1	122.2	5.8
Oakland	45,496	323	2	710.0	4.4
Oceana	16,658	5	1	30.0	6.0
Ogemaw	8,473	11	0	129.8	0
Ontonagon	5,971	116	1	1,942.7	16.7
Osceola	18,319	59	0	322.1	0
Oscoda	1,356	0	0	0	0
Otsego	6,633	0	0	0	0
Ottawa	39,859	710	0	1,781.3	0
Presque Isle	9,787	19	1	194.1	10.2
Roscommon	1,829	1	0	54.7	0
Saginaw	81,014	527	8	650.5	9.9
Sanilac	35,423	144	1	406.5	2.8
Schoolcraft	8,141	6	0	73.7	0
Shiawasee	34,202	470	4	1,374.2	11.7
St. Clair	55,528	428	6	770.8	10.8
St. Joseph	23,489	185	0	787.5	0
Tuscola	36,380	32	0	88.0	0
Van Buren	34,008	24	1	70.6	2.9
Washtenaw	49,177	73	0	148.4	0
Wayne	367,565	181	51	‡207.9	13.9
Wexford	17,775	7	3	‡23.9	16.9

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* Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

† This rate is computed exclusive of the population and cases in Bay City, Sault Ste. Marie, Detroit, and the township of Cedar Creek, Wexford county, because only fatal cases were reported from these places,—one fatal case from Bay City, three from Sault Ste. Marie, forty-four from Detroit and three from Cedar Creek township.

‡ The case-rates in Bay, Chippewa, Wayne and Wexford counties, are computed exclusive of the population and cases in Bay City, Sault Ste. Marie, Detroit and the township of Cedar Creek, in their respective counties, because only fatal cases were reported from these localities.

fatality, 1.1 death per 100 cases, occurred in the townships. A few localities are not included in computing these rates because only fatal cases were reported from these places. These localities are given in a footnote to Table 4.

TABLE 4.—*Exhibiting the numbers of outbreaks and cases of and deaths from measles, which occurred in the cities, villages, and townships of Michigan in 1902, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages and townships. Compiled from reports of local health officers to the Secretary of the State Board of Health.*

Classes of political divisions.	Estimated population.	Health jurisdictions.	Outbreaks in—			Cases.	Deaths.	Fatality. (Per cent deaths of cases.)	Rates per 100,000 population.	
			Localities.							
			No. of	Per cent of all localities.	No. of				Cases.	Deaths.
State	2,480,762	1,603	546	293.6	702	11,978	162	* .9	† 557.4	6.5
Cities	980,428	80	65	81.3	87	4,716	84	* .8	† 864.0	8.6
Villages	279,362	315	117	37.1	146	1,483	14	.9	530.9	5.0
Townships	1,220,972	1,208	364	30.1	469	5,779	64	* 1.1	† 473.5	5.2

† Fatality computed exclusive of one fatal case in Bay City, three in Sault Ste. Marie, forty-four in Detroit, and three in Cedar Creek township, because only fatal cases were reported from these localities; fatality in cities computed exclusive of cases in these cities and the fatality in the townships, exclusive of cases in Cedar Creek township.

‡ The case-rate for the State is computed exclusive of the population and cases in Bay City, Sault Ste. Marie, Detroit, and Cedar Creek township; and the case-rate in the cities is computed exclusive of population and cases in these cities, and the case-rate in townships, exclusive of population and cases in Cedar Creek township.

Distribution of measles by months in 1902.—The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months.

In computing the number of cases present in each month, each case is counted present in each month in which, or part of which, it was reported to have existed. The number of localities infected in each month were computed in a like manner.

The first line shows the number of cases present in each month of the year; and the second line shows the per cent the cases present in each month were of all cases reported, concerning which this information was stated. There were 1,915 cases of measles of which the month or months in which they were present were not reported.

The third line of the table shows the number of cases of measles taken sick each month; and the fourth line shows the per cent the cases taken sick in each month were of the total number of these cases. There were 2,029 cases of which the months in which they were taken sick were not reported.

The fifth line in Table 6 shows the number of localities in Michigan at which measles was reported present in each month of the year 1902. The last line shows the per cent these localities were of the number of localities (522) of which the month or months in which they were infected were reported. There were twenty-four localities of which this information was not stated.

TABLE 5.—*Exhibiting the reported number of outbreaks of measles which began, the number which ended, and the number which were present, in each month of the year, 1902, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began.....	74	57	70	95	74	61	58	22	30	21	29	41	632
Number ended.....	21	44	59	70	80	81	80	45	33	17	21	40	591
Number present...	105	142	170	198	203	181	154	91	77	62	74	95	....

TABLE 6.—*Exhibiting the number and per cent of cases of measles present, and the number and per cent of cases taken sick, and the number and per cent of localities infected with measles in Michigan in each month of the year 1902.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases present............	* 10,063	823	1,245	1,823	2,408	2,044	1,364	778	245	208	459	663	1,004
Per cent of cases present............	....	8.2	12.4	18.1	23.9	20.3	13.6	7.7	2.4	2.1	4.6	6.6	10.0
Number of cases taken sick.........	† 9,949	710	930	1,444	1,757	1,426	887	604	177	159	413	540	902
Per cent of cases taken sick.........	100	7.1	9.3	14.5	17.7	14.3	8.9	6.1	1.8	1.6	4.2	5.4	9.1
Number of infected localities	‡ 522	101	139	164	194	200	179	148	88	76	58	73	92
Per cent of infected localities.......	100	19.3	26.6	31.4	37.2	38.3	34.3	28.4	16.9	14.6	11.1	14.0	17.6

*There were 11,978 cases of measles reported in 1902; in 10,063 of these cases the month, or months, in which they were present were reported, leaving 1,915 cases of which this information was not stated.

† Of the 11,978 cases of measles reported in 1902, the months in which they were taken sick were reported in 9,949 instances.

‡Outbreaks of measles were reported present in 546 localities in 1902; in twenty-four of these localities the month, or months, in which they were infected with measles were not reported, leaving 522 localities of which this information was stated.

Table 6 shows that so far as indicated by the reports of cases which, however, are known to be incomplete, the greatest number of cases of sickness from measles occurred in April; Table 7 shows that the greatest number of deaths from measles occurred in May; and Table 18 indicates that according to the sickness statistics, the greatest prevalence of measles occurred in May.

TABLE 7.—*Showing the number of deaths from measles reported in each month of the year 1902; and the per cent the deaths in each month were of all deaths from measles during the year.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total, year.
Deaths from measles	15	13	25	28	33	21	8	2	2	3	5	7	162
Per cent	9.3	8.0	15.4	17.3	20.4	13.0	4.9	1.2	1.2	1.8	3.0	4.2	....

Source of the contagium of cases of measles.—Of the 11,978 cases of measles reported to this office, as having occurred in Michigan in the year 1902, the local health officials reported relative to the source of contagium in ways which may be summarized as follows: Traced to former case, 3,725; probably traced to a former case, 6; from outside jurisdiction, 214; probably from an outside jurisdiction, 15; unknown, 6,055; not stated, 1,960; attributed to infected articles, etc., 3.

Difficulties met with by local health officials.—The following quotations from health officers' reports are fair samples of many received at this office from local health officers showing some of the difficulties they have in restricting this disease:

"The first few cases that came to my knowledge were isolated and properly cared for, but I soon found that not one out of twenty cases was reported, and very few had a physician. The disease was in every school, and a large proportion of the families in the city, so it became impossible to control it or do anything to limit it. We therefore ceased to placard or do anything else with it. The disease was very mild and no deaths resulting. At first I censured the physicians, but soon found they were not called in one case out of twenty. I estimate the number of cases at between 200 and 300. Probably nearer the latter figure."—*J. T. Main, M. D., Jackson city, Jackson county.*

"Many others are sick, houses are placarded whenever such cases are reported. Many families do not employ a physician, in such cases, and some will take children to infected houses in order that their children will take the measles. They consider that it is better to have the disease now while weather is pleasant than any other time."—*D. Paterson, M. D., Mussey township, St. Clair county.*

"Child went to Eaton Rapids, exposed, came home, case not reported and had no doctor." —*Geo. C. Hafford, M. D., Albion city, Calhoun county.*

There were 395 cases including two deaths reported in this outbreak in Albion city, extending from Jan. 17 to Aug. 1. Dr. Hafford wrote this office that he had reported the facts to the prosecuting attorney.

In reference to the source of contagium of an outbreak of forty-six cases of measles in Newberry village, Luce county, the health officer wrote as follows:—

"A case brought from 'Soo'. Public funeral and no notification—among Finns—so said."

Outbreaks of measles reported traced to previous outbreaks.—According to reports of local health officers in Michigan, the contagium of measles was permitted to spread from 107 outbreaks to start 206 other outbreaks, resulting in 3,600 cases, including eighteen deaths. From some of these second localities, the contagium was further spread to third localities, resulting in thirty-nine outbreaks with 628 cases, including one death; from thence to fourth localities, resulting in seven outbreaks with thirty-one cases.

Thirty-one outbreaks, with an aggregate of 628 cases, including four deaths, were reported as having been traced to localities outside of Michigan. From some of these thirty-one outbreaks, the contagium was further spread to other localities, resulting in fourteen outbreaks with 173 cases, including one death; from some of these third localities the contagium spread to fourth localities, resulting in three outbreaks with eight cases.

A total of 300 outbreaks, with an aggregate of 5,068 cases, including twenty-four deaths, were traced to previous outbreaks of measles; and in thirteen outbreaks, with an aggregate of 266 cases, including six deaths, the source of contagium was reported by local health officers to have been from somewhere outside their jurisdictions, but the localities were not definitely stated.

In seventeen outbreaks, with an aggregate of forty-nine cases, including three deaths, other outbreaks in Michigan were reported as the *probable* source of contagium; and a locality outside of Michigan was reported as the *probable* source of contagium of an outbreak with fifty-six cases.

Immigrants possibly exposed to measles, destined to settle in Michigan.—During the year, thirteen notices were received from the Immigration Officer at Quebec, Canada, that measles had occurred on board of thirteen steamships prior to their arrival at Canadian ports,—the cases being landed at Dominion Quarantine, Grosse Isle,—and two notices were received from the United States Commissioner of Immigrants, at Philadelphia, Pa. These notices gave the names and destinations of immigrants on board intending to settle in Michigan. Copies of these notices, including the lists of the names of the immigrants, were made on blanks, designed in this office for this purpose, and promptly sent from this office to the health officers of the jurisdictions where the immigrants intended to settle.

The purpose of such action is to aid the local health officials in preventing outbreaks of dangerous communicable diseases, and, as a matter of fact, this method of forewarning the health officials of the localities where possibly infected immigrants are destined to settle has been productive of good results, and in recent years while these measures have been in use, very few outbreaks have been traced to immigrants.

During the year 1902 the following outbreaks were reported from jurisdictions where possibly infected immigrants were reported destined to settle, which occurred at or near the date of their arrival, and where the contagium was not reported as traced to some other source, also outbreaks traced by local health officers to immigrants:

The health officer of the city of Escanaba, Delta county, reported a child sick with measles from Oct. 27 to Nov. 19, who contracted the disease on board ship from Norway. The last notices of possibly exposed immigrants destined to settle in Escanaba were received in June.

The source of a case of measles in Hematite township, Iron county, was reported from Finland.

The health officer of Forsyth township, Marquette county, reported that he believed the source of contagium of an outbreak of measles in his jurisdiction to have been brought from Finland or contracted on the way. He reported fifty-six cases from May 7 to June 14. No notice was received of possibly exposed immigrants destined to settle in this locality.

A case of measles in Negaunee city, Marquette county, in November, was reported, "Emigrant just came from Finland." No notice was received later than June 22 of immigrants destined to settle in Negaunee.

In Ishpeming city, Marquette county, where measles continued present from the preceding year, with 249 cases and two deaths from January to October, 1902, the health officer reported the source of two cases in September as "probably crossing ocean from Europe." Notice was received Aug. 18 of immigrants possibly exposed to measles destined to settle in this city, and a copy sent to the local health officer.

The health officer of Greenland township, Ontonagon county, reported an outbreak of sixty-three cases extending from May 31, 1902, to Jan. 12, 1903; the source of this outbreak he reported as follows: "Family arrived at Mass City thirteen days ago, having come direct from Finland *via* Quebec—there have been no cases here for many months—contracted it somewhere 'en route.'" Notice was received April 28 of possibly exposed immigrants destined to settle in Ontonagon. Mass City is situated on the direct line to Ontonagon and this family may have been the family destined for Ontonagon.

In the cities of Ironwood and Crystal Falls, in Hancock village, and in Elm River township, there were outbreaks reported which commenced about the date stated for the arrival of immigrants possibly exposed to measles, but either the source of these outbreaks was not reported, or was reported as unknown. Notices were also received of possibly exposed immigrants destined to settle in the cities of Sault Ste. Marie, Grand Rapids and Saginaw, and in the township of Calumet. While cases of measles were reported present in these localities practically throughout the year, the local health officers did not report cases traced to immigrants. In the other localities where possibly exposed immigrants were destined to settle, no outbreaks were reported to this office at or near the dates of their arrival.

Estimated number of outbreaks and cases of measles prevented and lives saved by isolation and disinfection.—Tables 8 and 9 and the accompanying diagram compare the average numbers of cases and deaths in outbreaks of measles where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 9 it may be seen that during the thirteen years, 1890-1902, there were over fourteen times as many cases per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 8 it may be seen that during the year 1902 there were reported to the office of the State Board of Health 678 outbreaks of measles with 9,686 cases, including 104 deaths.* Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed, "Isolation and disinfection both neglected," there would have occurred 20,069 cases, including 156 deaths, and taking from these respectively the cases (9,686), including deaths (104), which did occur, leaves 10,383 cases, including 52 deaths, indicated as prevented in these 678 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 6,231 outbreaks which occurred during the thirteen years, 1890-1902, is 137,948 cases, including 1,035 lives. This is shown in Table 9.

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* In the compilation of the reports for Tables 8 and 9 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate and disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned, or statements doubtful."

Incubation period in measles.—By Table 10 it may be seen that for ten years, 1892-1901, the period of incubation in measles was reported in the greatest number of instances as fourteen days (304 instances), and the incubation period reported in the next greatest number of instances was ten days, in 230 instances. Nine days were reported in the most instances in 1902. The total number of instances in which the period of incubation was reported in days was, for the ten years, 1,174, and for the year 1902 it was reported in 186 instances. The average reported period of incubation for the ten years was 11.1 days, and for the year 1902 it was 10.5 days.

Ages of fatal and non-fatal cases of reported measles.—The reports of local health officials in Michigan, for the year 1902, stated the ages of 6,071 persons who were sick with measles, including the ages of 155 persons who died of that disease.

There are two erroneous and very harmful beliefs, quite prevalent among parents,—that measles cannot ultimately be escaped any more than teething, and that the least dangerous time for persons to have the disease is while quite young children. Whatever ground there may be for these beliefs elsewhere, reports to this office, as may be seen in tabulated form in Tables 11, 12, 13, 14 and 15, of this article, show that none exists in Michigan; but that, on the contrary, facts here bear evidence that measles is a preventable disease; and that it is *more* fatal to very young children than to persons in youth and middle age.

Table 11 shows that for the year 1902, 64 per cent of all deaths from this disease was in children under five years of age. Table 12 shows that for a period of ten years, 1892-1901, 61 per cent of all deaths from measles was in children under five years old. Table 14 shows that by sex the distribution of deaths was about equal, 61.6 per cent of males and 63.4 per cent of females who died from measles, during the period of years, 1893-1901, were under five years old.

**Definition of outbreak.*—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty-day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area. Also, comparisons of *years* require that outbreaks be counted as closed, at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks*, even where they extend from one year into the next. This explains any apparent discrepancy between the numbers of outbreaks, cases and deaths here given and the numbers given at the beginning of this article.

TABLE 8.—MEASLES IN MICHIGAN IN 1902. *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 678 outbreaks reported; (2) in the 251 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 17 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 28 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 35 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 44 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 223 outbreaks in which isolation and disinfection were both neglected; (8) in the 80 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (678 outbreaks.)*		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (251 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (17 outbreaks.)		(4) Isolation enforced—disinfection doubtful. (28 outbreaks.)		(5) Disinfection enforced—isolation neglected. (35 outbreaks.)		(6) Isolation enforced—disinfection neglected. (44 outbreaks.)		(7) Isolation and disinfection both neglected. (223 outbreaks.)		(8) Isolation and disinfection both enforced. (80 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals..........	9,686	104	2,049	42	95	1	106	3	237	1	331	3	6,601	52	267	2
Averages.......	14.29	.15	8.16	.17	5.59	.06	3.79	.11	6.77	.03	7.52	.68	29.60	.23	3.34	.03

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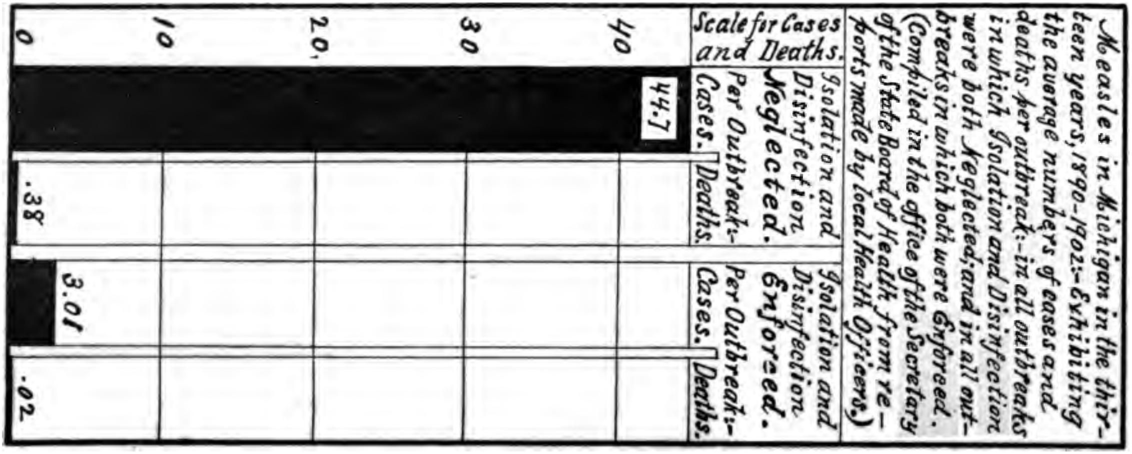
* A definition of the term "outbreak," and the facts relative to methods of compilation of outbreaks, are printed in foot-notes on pages 192 and 193.

ISOLATION AND DISINFECTION RESTRICT MEASLES.



Measles in Michigan in the thirteen years, 1890-1902:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were Enforced. (Compiled in the office of the Secretary of the State Board of Health from reports made by local Health Officers.)

[PLATE 1199.]

This diagram represents data in last line of Table 9.

TABLE 9.—*Exhibiting for the 13 years, and for each of the 13 years 1890–1902, the numbers of reported outbreaks, cases and deaths from measles; also for this 13-year period, the average number of cases and deaths per outbreak in all outbreaks; in those outbreaks in which isolation or disinfection or both were doubtful; isolation and disinfection both neglected; isolation and disinfection both enforced; and, also, the numbers of cases and deaths indicated as having been prevented by isolation and disinfection.*

Years.	All outbreaks.			Isolation or disinfection, or both, not mentioned, or statements doubtful.			Isolation and disinfection neglected.			Isolation and disinfection enforced.			Cases and deaths indicated as having been prevented by isolation and disinfection.*	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1890	419	11,189	103	353	6,326	59	57	4,819	44	6	19	0	24,233	220
1891	392	12,338	118	309	6,492	59	71	5,920	63	11	27	0	20,347	231
1892	236	4,406	67	187	2,427	45	31	1,953	22	7	8	0	10,462	101
1893	357	5,440	71	238	2,569	53	70	2,681	14	10	24	0	8,233	0
1894	358	7,345	49	246	4,190	42	70	2,971	7	13	32	0	7,849	0
1895	269	4,462	13	152	2,660	7	56	1,563	6	25	72	0	3,043	14
1896	399	17,068	158	177	4,178	26	146	12,626	131	21	54	0	17,438	201
1897	766	26,458	147	313	7,027	44	324	18,653	101	46	112	0	17,641	90
1898	512	9,318	101	219	2,683	47	165	6,150	49	49	118	2	9,764	53
1899	596	12,351	150	201	3,122	48	230	8,582	89	60	168	3	9,886	82
1900	899	15,492	194	315	4,845	52	338	9,330	124	72	336	1	9,320	139
1901	350	5,025	58	159	2,550	37	93	1,961	16	36	75	0	2,357	2
1902	678	9,686	104	251	2,049	42	223	6,601	52	80	267	2	10,383	52
Totals for the thirteen years, 1890-1902	6,231	140,578	1,333	3,126	51,118	561	1,874	83,810	718	436	1,312	8	†150,956 †137,948	†1,385 †1,035
Annual averages for the 13 years, 1890 1902	479	10,814	103	240	3,932	43	144	6,447	55	34	101	6	11,612	107
Av. cases and deaths per outbreak, 1890-1902	....	22.6	.21	....	16.4	.18	....	44.7	.38	....	3.01	.02	....	....

* The numbers of cases and deaths in this double columns are found by multiplying "All outbreaks" for each year by the average number of cases, or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year, to learn the numbers that would have occurred if efforts for the restriction of the disease had not been made. The instances in which isolation and disinfection were enforced are still so few that the evidence is not yet very satisfactory. † The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows: (1) the 150,956 cases, including 1,385 deaths, are totals of the columns representing cases and deaths saved as explained in the * foot-note; (2) the 137,948 cases, including 1,035 deaths, are obtained by multiplying the average numbers of cases and deaths per outbreak for the thirteen years, 1890-1902, (44.7 and .38 where isolation and disinfection were neglected), by the total number of outbreaks to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the thirteen-year period.

Graphic representation of interesting facts stated in the last line of figures in Table 9, may be seen in the diagram immediately preceding the table.

TABLE 10.—*Exhibiting for the ten years, 1892-1901, and for the year 1902, the reported period of incubation in days, in cases of measles in Michigan. Compiled from the reports of health officers in Michigan.*

Incubation period—days...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Instances in each day, for ten years, 1892 1901*......	1	5	6	10	23	24	145	56	134	230	33	83	15	304	25	16	2	10	1	15	30	2	2	0	0	1	0	0	0	1
Instances in each day for the year, 1902*............	0	0	1	1	2	0	22	14	47	31	14	6	3	37	1	0	0	2	0	3	1	0	0	1	0	0	0	0	0	0

* In many of these instances it was reported as *about* the number of days stated.

TABLE 11.—*Exhibiting in certain age-groups, the number of cases and the number of deaths from measles; the per cent that the cases in each group were of all cases of known ages, the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1902, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																			
Ages in groups of years.	All ages known.	Under 1.	1.	2.	3.	4.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-54.	55-59.	60 and over.
No. of cases*..	6,071	139	297	368	351	382	1,537	2,291	1,043	487	289	136	109	83	42	22	14	8	10
Per cent the cases in each group were of all cases of known ages...	100	2.3	4.9	6.1	5.8	6.3	25.3	37.7	17.2	8.0	4.8	2.2	1.8	1.4	.7	.4	.2	.1	.2
No. of deaths*.	155	38	30	17	10	4	99	20	5	9	7	3	1	4	2	0	3	1	1
Per cent the deaths in each group were of cases in that group.	2.6	27.3	10.1	4.6	2.8	1.0	6.4	.9	.5	1.8	2.4	2.2	.9	4.8	4.8	0	21.4	12.5	10.0
Per cent the deaths in each group were of all deaths at known ages...	100	24.5	19.4	11.0	6.5	2.6	63.9	12.9	3.2	5.8	4.5	1.9	.6	2.6	1.3	0	1.9	.6	.6
Per cent the death in special groups were of all deaths at known ages...	.....	63.9					76.8		13.5			2.6		3.9			2.6		.6

* Does not include those cases or deaths where the age was not stated.

Average age of cases of reported measles.—The average age of decedents from measles in 1902 was 7.5 years for males and 8.7 years for females. For the period of years, 1893-1901, the average age of decedents was 7.1 years for males and 8.9 for females.

The average age of those who recovered from measles in 1902 was 6.9 years for males and 10.1 years for females. For the nine year period, the average age was 9.6 years for males and 9.9 years for females.

TABLE 12.—*Exhibiting in certain age-groups, the number of cases and the number of deaths from measles in the year 1902, and for the ten years 1892-1901; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths. Compiled from all reports which stated the ages.*

Year.		Total No. included.	Per cent of cases and deaths in certain age-groups.													
			All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 years and over.
1902.	Cases.....	6,071	100	25.3	37.7	17.2	8.0	4.8	2.2	1.8	1.4	.7	.4	.2	.1	.2
	Deaths....	155	100	63.9	12.9	3.2	5.8	4.5	1.9	.6	2.6	1.3	0	1.9	.6	.6
1892-1901.	Cases.....	44,053	100	24.4	40.3	16.0	8.4	4.6	2.3	1.7	1.1	.6	.3	.1	.1	.1
	Deaths....	722	100	61.2	12.9	6.5	6.0	2.9	3.0	1.7	2.1	1.5	.8	.4	.4	.6

TABLE 13.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from measles, in Michigan, during the year 1902, and for the nine years, 1893-1901; also the average age and the number of cases included. Compiled from such reports as stated the ages.*

Year.	Sex.	No. of cases included.	Average age of persons who recovered—years.	Age.—In periods of years. Per cent of non-fatal cases in each period.												
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 years and over.
1902.	Males......	2,954	6.9	100	24.4	38.3	17.1	8.6	5.1	2.3	1.7	1.1	.6	.3	.2	.03	.2
	Females ..	2,962	10.1	100	24.2	38.5	18.0	7.6	4.5	2.2	1.9	1.6	.8	.4	.2	.2	.1
1893-1901.	Males......	21,391	9.6	100	24.0	41.5	15.6	8.1	4.9	2.3	1.5	1.0	.6	.2	.1	.1	.1
	Females ..	21,188	9.9	100	23.7	40.4	16.5	8.6	4.2	2.2	1.8	1.3	.7	.4	.2	.1	.1

Case-mortality rates from reported measles at the different ages.—For the reason explained previously in this article, the reports of *deaths* from measles since 1898, are probably accurate. This fact should be considered in reference to the case-mortality rates, or fatality, from measles, as shown in Table 15.

Great difficulty has been experienced in obtaining reports of *cases* of measles, and, while there has been much improvement each year, in reports of this disease, a large number of the cases are not yet reported.

The total number of cases in which the ages were given, for the period of thirteen years, 1890-1902, was 55,434 cases, of which number 926 were fatal cases,—giving a fatality, or case-mortality rate, for this period of years, of persons at all ages, of 1.7 deaths per 100 cases of measles.

TABLE 14.—*Exhibiting, by sex, the per cent of persons in certain age-groups who died of measles during the year 1902, and the averages for the nine years, 1893-1901.*

Year.	Sex.	Average age of decedent—years.	No. of deaths included.	Per cent of deaths in certain age-groups.										
				All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 years and over.
1902.	Males......	7.5	83	100	66.3	9.6	4.8	6.0	6.0	1.2	1.2	1.2	1.2	2.4
	Females...	8.7	72	100	61.1	16.7	1.4	5.6	2.8	2.8	0	4.2	1.4	4.2
1893-1901.	Males......	7.1	333	100	61.6	14.7	5.7	7.2	3.6	2.4	.6	1.5	1.5	1.2
	Females...	8.9	355	100	63.4	8.7	6.2	5.4	2.5	3.4	2.8	2.8	1.7	3.1

Table 15 shows that the fatality from this disease for thirteen years, 1890-1902, was greatest in children under one year of age; in children under five years of age the fatality was seven times the fatality in children from five to nine and from ten to fourteen years old, these periods having been the age-periods of lowest fatality. The fatality generally increased from these age-periods up to old age, being especially high after fifty-five years of age.

TABLE 15.—*In certain age-groups, the numbers of cases and deaths from measles in the 13 years, 1890-1902, and the per cent that the deaths in each group were of the cases in that group. Compiled from all the reports to the Secretary of the State Board of Health for the years 1890-1902, which stated the ages.*

	Under 1 year.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 to 64.	65 and over.
Cases—1890-1902..	1,000	13,500	21,982	9,074	4,732	2,600	1,264	940	649	347	174	77	37	34	24
Deaths—1890-1902.	192	564	122	54	58	31	25	15	20	14	8	5	4	3	3
Per cent..........	19.2	4.2	.6	.6	1.2	1.2	2.0	1.6	3.1	4.0	4.6	6.5	10.8	8.8	12.5

Duration and average duration of sickness from reported measles.—By Tables 16 and 17 it may be seen that the greatest per cent of decedents from measles died before the eleventh day of sickness, and also the greatest per cent of those who recovered were sick less than eleven days.

The average duration of sickness of fatal cases of measles for the year 1902 was 9.8 days for males and 7.8 days for females; for the ten years, 1892-1901, the average duration of fatal cases was 9.6 days for males and 9.7 days for females. The average duration of sickness of non-fatal cases was 14.3 days for males and 14.5 days for females; for the ten years, the average duration was 12.9 days for each sex.

TABLE 16.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from measles, in Michigan, during the year 1902, and the averages for the ten years, 1892-1901. Per cent of deaths arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

Fatal cases of measles.												
Year.	Sex.	No. of deaths included.	Average duration.	Duration of sickness:—Per cent of deaths in each period of days.								
				All deaths.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1902.	Males	36	9.8	100	27.8	38.9	16.7	8.3	2.8	0	0	2.8
	Females	42	7.8	100	42.9	42.9	4.8	7.1	0	0	2.4	0
1892-1901.	Males	173	9.6	100	32.9	37.0	10.4	11.6	3.5	4.0	0	.6
	Females	205	9.7	100	37.7	32.7	16.6	5.4	3.4	2.0	.5	2.4

TABLE 17.—*Exhibiting, by sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of non-fatal cases of sickness from measles in Michigan, during the year 1902, and the averages for the ten years, 1892-1901. Per cent of cases arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

Non-fatal cases of measles.																	
Year.	Sex.	No. of cases included.	Average duration.	Duration of sickness:—Per cent of cases in each period of days.													
				All periods.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1902.	Males	2,561	14.3	100	3.2	30.7	37.7	11.8	6.4	7.3	1.4	.8	.4	.04	.1	.2
	Females	2,590	14.5	100	3.0	29.4	38.6	11.5	5.9	8.6	.8	1.5	.4	.2	.04	.1
1892-1901.	Males	15,022	12.9	100	5.9	36.4	36.5	9.6	7.5	1.8	.9	.5	.4	.1	.1	.2
	Females	14,879	12.9	100	5.6	35.5	37.6	9.8	7.9	1.7	.7	.5	.3	.2	.1	.1

Proportion of measles in the different months of the year 1902.—Table 18 exhibits evidence, from two sources, on the proportion of measles reported in each month of the year 1902, namely, the sickness-statistics and the contagious-disease statistics. The *first* line states the per cent of all weekly postal-card *reports,* made by physicians in active general practice, which reported the presence of measles under their observation. The *second* line states the average per cent of all these *reporters* who stated the presence of measles. The *third* line states the average order of prevalence of measles in the list of diseases reported. The *fourth* line represents the *prevalence* of measles, according to the sickness-statistics, being a combination of the first and third lines of this table (the method of combining them is explained on pages 122-3 of the annual report of this Board for the year 1890). In this fourth line the smallest numbers indicate the greatest prevalence,—for instance, May is 1 or *first* in prevalence,—more measles in May than in any other month; June is 2 or *second* in prevalence; April is 3 or *third* in prevalence; and so on. The *fifth* line represents by months the number of outbreaks of measles reported to this office by health officers, including only the reports which gave the months in which the outbreaks began—reports of thirty-two outbreaks did not give dates.

TABLE 18.—*Measles in Michigan during the year 1902, exhibiting, by months, the per cent of all weekly card-reports received which stated the presence of measles; the average per cent of all observers reporting weekly who reported measles; the average order of prevalence of measles where it was present; the prevalence of measles, according to the sickness statistics, and the number of outbreaks of measles reported by health officers.*

1902.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Per cent of weekly card reports stating presence of measles............	10	9	12	13	17	17	16	11	3	4	4	6	9
Average per cent of observers who reported measles present............	16	18	18	20	32	23	23	21	7	9	5	11	13
Average order of prevalence where present............	2.5	2.9	3.0	2.5	2.3	2.2	2.1	2.1	3.4	3.9	2.9	1.9	2.6
Prevalence*.........	(7)	9	7	5	3	1	2	4	11	12	10	6	8
Outbreaks†	632	74	57	70	95	74	61	58	22	30	21	29	41

* According to the sickness statistics, as explained in the text accompanying this table. In the fourth line of figures in this table, the smallest numbers indicate the greatest prevalence.
† The numbers in this line show the numbers of outbreaks which began each month.

The evidence of the sickness-statistics, summarized in the fourth line of this table (18) indicates that the maximum prevalence of measles in Michigan in 1902 occurred in May, and the minimum where sickness was reported present was in September. The fifth line of the table, which is based on the contagious-disease statistics, indicates that the maximum number of reported outbreaks occurred in April and the minimum in October. This evidence is only for a single year, and might, therefore, be exceptional. In Table 14, in the article on sickness statistics on a preceding page of this annual report for 1903, is a statement of the average per cent of weekly card reports stating the presence of measles by months for the ten years, 1892-1901, from which it appears that the maximum occurs in May, and the minimum in September and October.

SCARLET FEVER IN MICHIGAN.—YEAR ENDING DECEMBER 31, 1902.

During the year ending December 31, 1902, there were reported to the Secretary of the State Board of Health, 1,014 outbreaks of scarlet fever in 759 localities in Michigan, which resulted in 6,582 cases,* including 248 deaths.

The average numbers of cases of sickness and of deaths per outbreak, in 1902, were 6.49 cases, including .24 of one death. The fatality, i. e., the proportion of reported cases which proved fatal, was 3.8 per 100 cases.

Scarlet fever in 1902, compared with previous years.—From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by local health authorities throughout the State to supply in their reports the information desired by the State Board. These facts, together with the constantly increasing population, make it difficult to determine the exact increase or decrease of prevalence of the disease in the State by comparison of the numbers of outbreaks of the disease, and the cases and deaths resulting therefrom, and this should be borne in mind in studying Table 1. Because of these facts a constant increase in the reported prevalence of the disease might reasonably be expected.

TABLE 1.—SCARLET FEVER IN MICHIGAN. *Numbers of reported outbreaks, localities (in which they occurred), cases and deaths; average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal, as reported for the years 1901 and 1902, with the departures of the same for 1902 from 1901 and from the averages of the same for the 18 years, 1884-1901.*

Year.	Reported outbreaks.	Reported localities.	Reported cases.*	Av. No. of cases per outbreak	Reported deaths.	Av. No. of deaths per outbreak.	Deaths per 100 cases.
1901	1,001	754	7,726	7.72	298	.30	3.9
1902	1,014	759	6,582	6.49	248	.24	3.8
Departures of 1902 from 1901	+13	+5	−1,144	−1.23	−50	—.06	—.1
Av. for eighteen years, 1884-1901	531	437	4,285	8.07	229	.43	5.3
Departures of 1902 from the averages for 18 years, 1884-1901	+483	+322	+2,297	−1.58	+19	—.19	—1.5

In 1902 there were 1,144 cases more and 50 deaths less than in 1901.

While the number of outbreaks in 1902 was almost double the average number for the eighteen years, 1844-1901, the average numbers of cases and deaths *per outbreak* were less.

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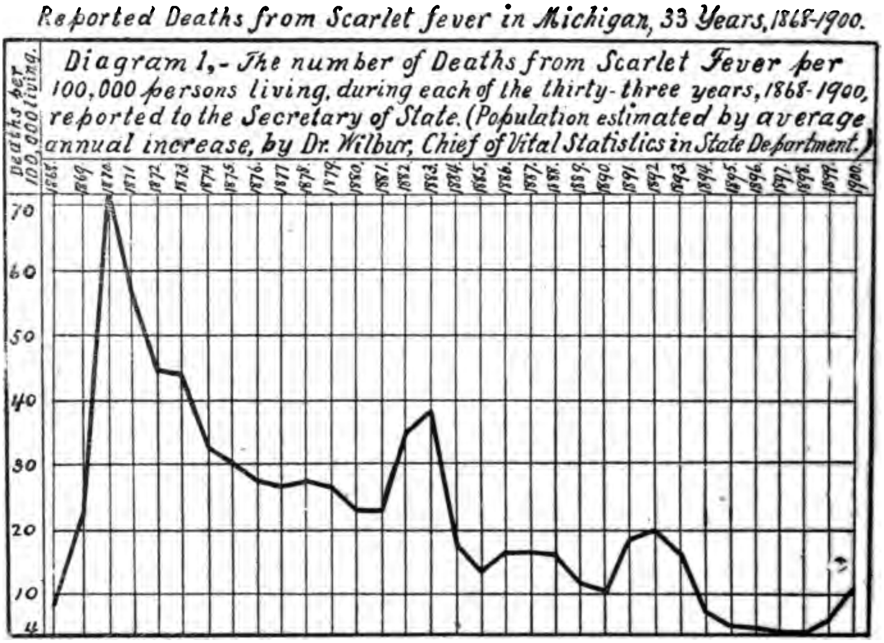
*Throughout this article, "cases" include deaths, unless the word non-fatal is used.

TABLE 2.—*Exhibiting the reported number of deaths from scarlet fever in Michigan per 100,000 population for each of the 35 years, 1868-1902. (The data for this table were supplied by C. L. Wilbur, M. D., Chief of Division of Vital Statistics, Department of State.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Death rate....	8.48	22.09	71.96	56.62	44.33	43.94	32.23	29.99	27.41	26 91	27.74	26.26	22.66	22.82

Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Death rate.	34.25	37.94	17.91	13.13	16.69	16.25	16.13	11.72	10.60	18.70	20.23	16 30	7.27	5.09	4.58

Year.	1897.	1898.	1899.	1900.	1901.	1902.
Death rate.	4.0	3.9	6.0	11.2	11.8	10.6



Reported Deaths from Scarlet fever in Michigan, 33 Years, 1868-1900.

Diagram 1,- The number of Deaths from Scarlet Fever per 100,000 persons living, during each of the thirty-three years, 1868-1900, reported to the Secretary of State. (Population estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.)

[PLATE 1110]

Table 1 and comments thereon are based upon reports to the office of the State Board of Health. Table 2, Diagram 1, and comments thereon are based upon returns of deaths, made to the Secretary of State. For all years preceding 1898 the statistics of deaths were collected after the close of the year in which they occurred, for all years after 1897 the deaths were recorded before burial, and returns were made to the Secretary of State early in the following month. There is reason to believe that under the new law nearly all deaths are included in the statistics, whereas, before 1898 a considerable proportion was omitted. This fact should be held in mind in comparing the deaths reported for the year 1902 with those reported in years previous to 1898. The final compilation of deaths from scarlet fever has not been made by the Division of Vital Statistics, in the State Department, consequently the death-rate computed for 1902 (10.6) may not be quite accurate; because where two diseases are mentioned as causing a death, as not infrequently occurs, not always the same one is used in the final compilation as in the Bulletin of Vital Statistics.

Sickness-rates, by counties, from reported scarlet fever.—While there has been a steady improvement in reporting cases of scarlet fever, it is probable that there are cases or light forms of the disease, requiring no physician, that are not reported. Consequently, the reported cases of scarlet fever are not as complete as the reports of deaths from this disease, yet comparisons may be made, subject to the mental reservation that not all cases are reported, and that the omissions may be greater in some parts of the State than in others.

Table 3 shows that the greatest sickness-rate from reported scarlet fever was in Grand Traverse county, where the ratio of cases to population was 782.7 to 100,000. Marquette county had the next highest rate, 716.1 cases per 100,000 population. Benzie, Delta, Mecosta and Montmorency counties had high rates. Sickness from scarlet fever was reported from all but two counties—Crawford and Oscoda. Crawford county in 1900 and 1901 had the highest sickness-rates for those years, and Oscoda had the highest rate for the year 1898, and high rates for the years 1899 and 1900.

Death-rates, by counties, from reported scarlet fever.—By Table 3 it may be seen that the greatest death-rate from reported scarlet fever, 38.8 deaths per 100,000 population, was in Macomb county. Grand Traverse county had nearly as high a rate, 37.3. These rates were over three times the average death-rate for the State. From twenty-three counties, from which an aggregate of 652 cases of scarlet fever was reported, there were no deaths reported from this disease. The lowest death-rate, in counties from which deaths were reported from scarlet fever, was in the counties of Lenawee (2.1), Kalamazoo (2.2) and Van Buren (2.9). The death-rates are now believed to be fairly accurate.

Fatality, by counties, from reported scarlet fever.—The fatality from reported scarlet fever in 1902 was, for the whole State, 3.8, or about one death to twenty-six cases. In Luce county, of the two reported cases one proved fatal. Ogemaw county had the next greatest fatality, 11.1 deaths per 100 cases. In counties from which deaths from scarlet fever were reported, the fatality was lowest in the counties of Kalamazoo, Mecosta and Hillsdale, one death per 167 cases in Kalamazoo, one death per 111 cases in Mecosta and one death per 110 cases in Hillsdale county.

Distribution of reported scarlet fever in cities, villages and townships.—From data in Table 4 it may be observed that 88.8 per cent of the cities in Michigan, 45.7 per cent of the villages, and 45.0 per cent of the townships, were infected with scarlet fever. But the average population of the cities is nearly fourteen times the average population of the villages.* The highest case-rate (304.2) occurred in the villages, and the highest death-rate (11.9) occurred in the cities. The highest fatality occurred in the cities, 4.2 deaths per 100 cases, the fatality in the villages having been 3.2, and the fatality in the townships, 3.5 deaths per 100 cases.

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*The average population of the cities is 12,255, of the villages 887, and of the townships 1,011.

Scarlet fever in each month of the year 1902.—The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. (Thirty-five of the outbreaks reported as having ended in January, and one outbreak reported as having ended in February, were outbreaks which began the preceding year, and in which there were no new cases reported in 1902.) In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were eight more beginnings than endings of outbreaks reported during the year 1902.

The first line in Table 6 shows the number of localities in Michigan at which scarlet fever was reported present in each month of the year 1902. The second line shows the per cent these localities were of the total number of localities reported for the year.

The third line shows the number of cases present in each month of the year; and the fourth line shows the per cent the cases present in each month were of all cases reported, concerning which this information was stated. There were 551 cases of which the month or months in which they were present were not reported.

The fifth line of the table shows the number of cases taken sick each month; and the last line shows the per cent the cases taken sick each month were of the total number of these cases. There were 583 cases of which the months in which they were taken sick were not reported.

The influence of seasonal changes upon the prevalence of scarlet fever may be seen in Table 6. While present in the State during the entire year, it was least prevalent during the months of June, July and August, reaching a minimum in August.

Source of contagium of scarlet fever, how the disease is spread, and the vitality of the contagium.—Of the 6,582 cases of scarlet fever reported during the year 1902, the local health officers reported the source of contagium, as follows: Traced to a former case, 1,141; probably traced to a former case, 37; attributed to infected houses, articles, clothing, etc., 25; source of contagium unknown, 3,918; source of contagium not stated, 1,296; traced to an outside jurisdiction, 130; probably from an outside jurisdiction, 27; attributed to unsanitary conditions, 8.

That there is a specific germ which causes scarlet fever seems to be proved by the known communicability of the disease.

Reports of health officers and physicians indicate that the scarlet fever germ frequently retains its vitality for a long time outside of the human body, in an apparently dormant or inactive state, in houses, clothing, carpets, furniture, etc., and is then capable of developing scarlet fever in persons coming into such houses or in contact with or near such articles, thus showing the importance of carefully disinfecting all infected houses and articles, even where they are not to be used for a long time.

TABLE 3.—*Numbers of cases and deaths reported from scarlet fever, and the cases and deaths per 100,000 persons living in each county in Michigan during the year 1902. Compiled from reports of health officers.*

State and counties.	Estimated population of Michigan for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.†	Deaths.	Cases.†	Deaths.
State	2,480,762	6,582	248	265.3	10.0
Alcona	5,781	12	0	207.4	0
Alger	7,358	2	0	27.2	0
Allegan	38,686	60	0	155.1	0
Alpena	18,432	26	1	141.1	5.4
Antrim	17,944	27	2	150.5	11.1
Arenac	10,779	8	0	74.2	0
Baraga	4,350	7	0	160.9	0
Barry	22,118	18	0	81.4	0
Bay	62,734	102	5	162.6	8.0
Benzie	10,221	66	1	645.7	9.8
Berrien	50,339	67	2	133.1	4.0
Branch	28,343	45	1	158.8	3.5
Calhoun	49,927	104	2	208.3	4.0
Cass	20,776	31	1	149.2	4.8
Charlevoix	14,718	28	1	190.2	6.8
Cheboygan	16,144	63	3	390.2	18.6
Chippewa	23,338	101	5	432.8	21.4
Clare	8,486	23	1	271.0	11.8
Clinton	24,760	38	1	153.5	4.0
Crawford	3,019	0	0	0	0
Delta	25,417	138	6	542.9	23.6
Dickinson	18,932	38	1	200.7	5.3
Eaton	31,352	79	2	252.0	6.4
Emmet	17,777	50	0	281.3	0
Genesee	42,220	119	0	281.9	0
Gladwin	7,116	15	0	210.8	0
Gogebic	17,622	74	3	419.9	17.0
G'd Traverse	21,465	168	8	782.7	37.3
Gratiot	30,259	26	0	85.9	0
Hillsdale	29,729	110	1	370.0	3.4
Houghton	73,353	163	8	222.2	10.9
Huron	34,796	80	4	229.9	11.5
Ingham	39,860	48	0	120.4	0
Ionia	34,165	106	3	310.3	8.8
Iosco	9,548	27	1	282.8	10.5
Iron	10,220	3	0	29.4	0
Isabella	23,230	50	3	215.3	12.9
Jackson	48,782	61	0	125.0	0
Kalamazoo	45,060	167	1	370.6	2.2
Kalkaska	7,629	22	2	288.4	26.2
Kent	132,302	320	9	241.9	6.8
Counties.					
Keweenaw	3,353	4	0	119.3	0
Lake	4,643	22	0	473.8	0
Lapeer	27,229	68	3	249.7	11.0
Leelanau	10,882	11	1	101.1	9.2
Lenawee	48,360	84	1	173.7	2.1
Livingston	19,406	49	1	252.5	5.2
Luce	3,193	2	1	62.6	31.3
Mackinac	7,857	20	0	254.6	0
Macomb	33,528	159	13	474.2	38.8
Manistee	28,434	72	3	253.2	10.6
Marquette	42,313	303	8	716.1	18.9
Mason	19,037	54	4	283.7	21.0
Mecosta	20,681	111	1	536.7	4.8
Menominee	28,144	68	2	241.6	7.1
Midland	14,845	30	1	202.1	6.7
Missaukee	10,088	18	0	178.4	0
Monroe	32,612	112	3	343.4	9.2
Montcalm	32,286	102	2	315.9	6.2
Montmorency	3,498	18	1	514.6	28.6
Muskegon	36,980	29	0	78.4	0
Newaygo	17,189	37	0	215.3	0
Oakland	45,496	77	2	169.2	4.4
Oceana	16,658	57	0	342.2	0
Ogemaw	8,473	27	3	318.7	35.4
Ontonagon	5,971	26	2	435.4	33.5
Osceola	18,319	30	0	163.8	0
Oscoda	1,356	0	0	0	0
Otsego	6,633	21	1	316.6	15.1
Ottawa	39,859	61	2	153.0	5.0
Presque Isle	9,787	3	0	30.7	0
Roscommon	1,829	3	0	164.0	0
Saginaw	81,014	197	11	243.2	13.6
Sanilac	35,423	144	5	406.5	14.1
Schoolcraft	8,141	20	2	245.7	24.6
Shiawassee	34,202	86	3	251.4	8.8
St. Clair	55,528	216	4	389.0	7.2
St. Joseph	23,489	39	1	166.0	4.3
Tuscola	36,380	119	5	327.1	13.7
Van Buren	34,008	88	1	258.8	2.9
Washtenaw	49,177	110	3	223.7	6.1
Wayne	367,565	1,159	78	315.3	21.2
Wexford	17,775	34	2	191.3	11.3

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*Population estimated by average annual increase (arithmetical method), based on the State Census of 1894 and the U. S. Census of 1900.

†Include deaths from scarlet fever.

The following quotations are from a few of such reports sent to this office:—

"Supposed to be from old houses where scarlet fever had been three or four years ago and not fumigated and families going into same."—*Guy L. Laraway, Boyne Falls village, Charlevoix county.*

"A book taken from a house where they had scarlet fever last spring was taken to school."—*L. E. Higbee, M. D., Benton township, Eaton county.*

"Probably from removing paper from the wall of a house where disease had been."—*Chas. L. E. Higbee, M. D., Menton township, Eaton county.*

"Parents received letters from Minnesota, where they had had scarlet fever two or three weeks previously."—*Enoch Emerson, M. D., Spring Arbor township, Jackson county.*

"From baby cart, bought second hand."—*E. B. Balch, Eden township, Mason county.*

"Disease supposed to have remained in the house three or four years."—*F. J. Hackney, M. D., Rose township, Ogemaw county.*

"Older sister had scarlet fever in Chicago. As soon as she was up she packed her clothing (disinfection not made) and came home, arrived morning of April 11, unpacked, spread clothing on bed where these two younger ones sleep. Before entering her father's house she went in her aunt's place (in same yard) and picked up the baby and kissed it. Saturday, the 19th, the baby developed scarlatina."—*A. D. Hulbut, Columbia township, Van Buren county.*

TABLE 4.—*Exhibiting the numbers of outbreaks and cases of and deaths from scarlet fever which occurred in the cities, villages and townships of Michigan in 1902, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages, and townships. Compiled from reports of local health officials to the Secretary of the State Board of Health.*

Classes of political divisions.	Estimated population.	Health jurisdictions.	Outbreaks in:			Cases.*	Deaths.	Fatality. (Per cent cases of deaths.)	Rate per 100,000 population.	
			Localities.							
			No. of.	Per cent of all localities.	No. of.				Cases.	Deaths.
State (83 counties)..........	2,480,762	1,603	759	47.3	1,014	6,582	248	3.8	265.3	10.0
Cities..................	980,428	80	71	88.8	105	2,758	117	4.2	281.3	11.9
Villages....................	279,362	315	144	45.7	181	850	27	3.2	304.3	9.7
Townships....................	1,220,972	1,208	544	45.0	728	2,974	104	3.5	243.6	8.5

*Include deaths.

TABLE 5.—*Exhibiting the reported number of outbreaks of scarlet fever which began, the number which ended, and the number which were present, in each month of the year 1902, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began.....	137	96	62	73	67	39	40	59	68	75	95	78	889
Number ended.....	80	88	101	78	89	67	58	37	47	66	68	102	881
Number present...	275	291	262	233	217	166	137	138	167	196	223	232	....

TABLE 6.—*Exhibiting the number and per cent of localities infected with scarlet fever, and the number and per cent of cases of scarlet fever present, and the number and per cent of cases taken sick, in Michigan, in each month during the year 1902.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of localities................	*759	273	289	261	231	213	165	137	137	167	195	223	229
Per cent of localities................	....	36.0	38.1	34.4	30.4	28.1	21.7	18.1	18.1	22.0	25.7	29.4	30.2
Number of cases present............	†6,031	833	991	876	787	809	518	454	375	531	677	770	849
Per cent of cases present............	....	13.8	16.4	14.5	13.0	13.4	8.6	7.5	6.2	8.8	11.2	12.8	14.1
Number of cases taken sick.........	‡5,999	688	676	690	546	532	305	314	263	389	477	539	580
Per cent of cases taken sick	100	11.5	11.3	11.5	9.1	8.9	5.1	5.2	4.4	6.5	8.0	9.0	9.7

*Number of localities reported infected with scarlet fever in 1902.

†There were 6,582 cases of scarlet fever reported in 1902; in 6,031 of these cases the month or months in which they were present were reported, leaving 551 cases of which this information was not stated.

‡Of the 6,582 cases of scarlet fever reported in 1902, the months in which they were taken sick were reported in 5,999 instances.

The following letter to this office from Dr. John Gillett, health officer of Sparta village, Kent county, shows a difficulty experienced by many health officers in restricting the spread of scarlet fever because often light cases of the disease, not requiring medical aid, are not reported:—

"We have in this village a family, one child of which has had an attack of scarlet fever and is not through desquamation yet. They have sent the other children to school, and did not report the case, not having had medical advice. It did not come to my knowledge until Tuesday, when I was trying to trace the source of the last case, when I was informed that this child had been down with the disease, and that the people gave as a reason for not reporting the case that they did not wish to be quarantined. I had the children kept from school, notifying the superintendent of the school."

TABLE 7.—*Exhibiting the number and per cent of deaths from scarlet fever in Michigan in each month of the year 1902.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number of deaths.	35	20	40	29	22	14	8	12	15	16	23	14	248*
Per cent of deaths	14.1	8.1	16.1	11.7	8.9	5.6	3.2	4.8	6.0	6.5	9.3	5.6	....

*Includes three deaths from scarlatinal nephritis, one each in January, April and May.

Outbreaks of scarlet fever reported traced to previous outbreaks.—According to reports of local health officers in Michigan the contagium of scarlet fever was permitted to spread from 123 outbreaks, having an aggregate of 2,315 cases, including ninety-nine deaths, to other localities, resulting in 159 outbreaks, with an aggregate of 751 cases, including twenty deaths; from some of these second localities the contagium further spread to third localities, resulting in three outbreaks, with five cases.

Twenty-four outbreaks with an aggregate of eighty-two cases, including one death, were reported as having been traced to localities outside of Michigan; and from one of these outbreaks the contagium spread to another locality resulting in four cases.

A total of 187 outbreaks with an aggregate of 842 cases, including twenty-one deaths, reported as actually traced to previous outbreaks.

In thirty-one outbreaks, with an aggregate of 132 cases, including one death, previous outbreaks were given as the probable source of contagium.

Immigrants possibly exposed to scarlet fever destined to settle in Michigan.—During the year, notices were received from the Immigration Officer at Quebec, Canada, that scarlet fever had occurred on board of four steamships prior to their arrival at Canadian ports,—the cases being landed at Dominion Quarantine, Grosse Isle,—and one notice was received from the United States Commissioner of Immigrants, at Philadelphia, Pa. These notices gave the names and destinations of immigrants on board intending to settle in Michigan. Copies of these notices, including the lists of the names of the immigrants, were made on blanks, designed in this office for this purpose, and promptly sent from this office to the health officer of the jurisdictions where the immigrants intended to settle.

The purpose of such action is to aid the local health officials in preventing outbreaks of dangerous communicable diseases, and, as a matter of fact, this method of forewarning the health officials of the localities where possibly infected immigrants are destined to settle has been productive of good results, and in recent years while these measures have been in use, very few outbreaks have been traced to immigrants.

Notices were received of immigrants possibly exposed to scarlet fever destined to settle in the cities of Marquette, Ironwood, Negaunee, Ishpeming, Detroit, and the township of Calumet. Scarlet fever was reported present in these places practically throughout the year, but no cases were reported by the local health officers as traced to immigrants. In the cities of Bessemer and Cadillac and in the village of Boyne Falls, scarlet fever was reported present at the date of the arrival of immigrants, but the outbreaks had commenced prior to their arrival, and no new cases reported from immigrants.

From the other localities, in which possibly exposed immigrants were destined to settle, there were no outbreaks of scarlet fever reported at or near the dates of their arrival.

A case of scarlet fever in Baraga township, Baraga county, in January, was reported to have been an immigrant from Finland. Correspondence with this office gave the following information in regard to this case:—An immigrant child from Finland, in care of its parents, was discovered at Keweenaw Bay, Baraga township, sick with scarlet fever, in a smoking car bound for Ontonagon. Their destination was Mass City, Greenland township, Ontonagon county. The R. R. agent at Keweenaw Bay telegraphed this information to the agent at Mass City, who telephoned the local health officer, Dr. W. P. Harlow. Dr. Harlow sent the following telegram to the Secretary of the State Board of Health:

> "Smoking car on train No. 81, Mineral Range, Keweenaw Bay to Ontonagon today, infected with scarlatina. Matter in your hands."

Immediately on receipt of this telegram, Secretary Baker telegraphed to Dr. J. S. Nitterauer, health officer of Ontonagon, to disinfect the car, and also telegraphed to the general superintendent, C. E. Lytle, at Marquette, that the car should be disinfected.

Dr. Harlow, acting on the advice of the prosecuting attorney for the county and attorney for the township, in view of the fact that there was no pest house or detention hospital at Mass City, sent the immigrants on to Ontonagon. Here, the health officer, Dr. Nitterauer, not having yet received Dr. Baker's telegram, ordered the car kept locked and sent to Houghton, where there was a pest house. At Mass City, two men who were in the infected car were allowed to leave. The car was returned to Keweenaw Bay; and, on April 7, the following letter in regard to care of this case was received at this office from Dr. R. S. Buckland, health officer of Baraga township:

> "With regard to the case of scarlet fever at Keweenaw Bay. Drove to Keweenaw Bay on the night of January 11. Fumigated railroad coach and railroad depot and put card on house. Fumigated again on February 2, and discharged patient."

Dr. Nitterauer wrote to Secretary Baker asking where this case should have been taken care of? And if he had taken care of it there, would the county have had to bear the expense or should it have been charged up to Baraga county? Secretary Baker replied to these questions as follows:

> "An infected house, article, or garment, car, and corpse dead from a dangerous communicable disease, should be disinfected in the jurisdiction *wherever it is found to be,* and the fact that one health officer has been negligent in permitting or allowing or ordering the infected thing to escape his jurisdiction, makes no difference to the suceeding jurisdictions. Relative to persons sick with a communicable disease dangerous to the public health, the same reasoning applies. It was preëminently your duty to take care of the patients. You could have detained the car, until you or your local board of health could make provision for the care of the scarlet fever patients. It was also the duty of the health officer of Greenland township, in which I believe Mass City is situated. * * *
>
> "I am not informed that Dr. R. S. Buckland, health officer of Baraga township, had knowledge of the travelers infected with scarlet fever, but that the information was wired to the railroad agent at Mass City by the railroad agent at Keweenaw Bay. The agent (R. R.) 'phoned Dr. Harlow of the facts at Greenland before the train arrived, and that he had full time to act as the law directs. Sec. 4424, C. L. 1897, in providing for the payment of what is done for the safety of the inhabitants by providing nurses and other assistance and necessaries for the persons sick, says it shall be at the charge of the person himself or other persons liable for his support, if able, otherwise as 'a charge of the county to which he belongs.' Whether he would be considered to belong to the county wherein his destination was situated, or whether, for public health purposes, the county where he was first known to be infected is liable therefor, is strictly a legal question, and I think would depend upon statutory construction.
>
> "I know of no decision which would establish a precedent."

In regard to an outbreak of four cases of scarlet fever in Spring Lake village, Ottawa county, the health officer reported that they were a family of immigrants from Gothenburg, on the S. S. Ivernia, via Boston, with tickets through, arriving at Spring Lake on Sept. 12, and were taken sick Sept. 29. No immigrant notice was received of these cases having been exposed to scarlet fever on shipboard.

Violation of public health laws.—At Walloon Lake, a resort in Melrose township, Charlevoix county, a child in a family of resorters, at the Hotel

Mizer, was taken sick with scarlet fever. Dr. Wirth, a physician from Highland Park, Illinois, also a resorter, diagnosed the case and notified the proprietor. Mr. Miser, the proprietor, insisted, upon their immediately leaving the hotel, and procured tickets for their passage on a sleeper on the G. R. & I. road. Dr. W. D. Porter, the physician attending them in Cincinnati, notified the railroad authorities of this violation of health laws. The railroad company immediately took action to investigate the matter, to disinfect the cars, etc., and notified Secretary Baker. Secretary Baker wrote to Dr. J. R. Kay, the health officer of Melrose township, in whose jurisdiction Hotel Miser is situated, asking if this case had been reported to him and what measures he had taken to comply with the public health laws. Dr. Kay replied that he had not been notified, that it was not Mr. Miser's first offense, and that he was told, on inquiry, that the room had been disinfected with sulphur and was now occupied, that Mr. Miser had procured the tickets for this family by misrepresenting the facts to the ticket agent, and asked Secretary Baker for further instructions. Secretary Baker wrote in reply:

> "There should be no delay in the facts being reported to the supervisor, who should begin action against this hotel proprietor at once; the prosecuting attorney conducting the suit, if requested, and he should be so requested. * * * It appears to me that there is no question that Mr. Mizer can be brought under Sec. 4473-4, C. L. 1897, for knowingly and wilfully taking or assisting in taking a child infected with scarlet fever into a public conveyance, or for his failure to report the case, as required by Sec. 4452, C. L. 1897."

Estimated number of cases of scarlet fever prevented, and number of lives saved, by isolation and disinfection.—Tables 8 and 9 and the accompanying diagram compare the average numbers of cases and deaths in outbreaks of scarlet fever where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where those measures were neglected.* By Table 9 it may be seen that during the sixteen years, 1887-1902, there were nearly five times as many cases and over five times as many deaths in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 8 it may be seen that during the year 1902 there were reported to the office of the State Board of Health 930 outbreaks of scarlet fever, with 4,204 cases, including 148 deaths.† Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 7,700 cases, including 251 deaths, and taking from these respectively the cases (4,204), including deaths (148), which did occur, leaves 3,496 cases, including 103 deaths, indicated as prevented in these 930 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 9,004 outbreaks which occurred during the sixteen years, 1887-1902, is 47,961 cases, including 1,796 lives. This is shown in Table 9.

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*In the compilation of the reports for Tables 8 and 9, and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate and disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate and

Incubation period in scarlet fever.—By Table 10 it may be seen that for ten years, 1892-1901, the period of incubation in scarlet fever was reported in the greatest number of instances as seven days (224 instances), and the incubation period reported in the next greatest number of instances was ten days, in 168 instances. Seven days were also reported in the most instances in 1902. The total number of instances in which the period of incubation was reported in days was, for the ten years, 1,384, and for the year 1902 it was reported in 239 instances. The average reported period of incubation for the ten years was 9.0 days, and for the year 1902 it was 9.2 days.

Ages of fatal and non-fatal cases of reported scarlet fever.—Of the total number of cases, including deaths, reported to this office for the year 1902, the number of deaths per 100 cases was 3.8; and of the smaller number of cases, including deaths, of which the ages were stated, the number of deaths per 100 cases was 5.5. Of the 6,582 cases of scarlet fever reported, of which 248 were fatal cases, the ages were stated for 4,418 cases, of which 243 were fatal. There were only five fatal cases of which the ages were not stated, and there were 2,159 non-fatal cases of which the ages were not stated. This fact should be considered in studying the fatalities by age-groups and by single years of age in Table 11. By this table it may be seen that the fatality was greatest in children under one year of age, the fatality decreasing each succeeding year and periods of years up to twenty years of age. In children under five years of age the number of deaths per 100 cases was 12.9. This fatality was more than double that of any other five year age-group up to thirty years.

Table 12 shows that the greatest per cent of all cases, fatal and non-fatal, of scarlet fever occurred in children from five to nine years old, and the greatest per cent of all deaths was in children under five years of age, both for the year 1902 and for the ten years, 1892-1901.

Table 13 shows that, by sex, the deaths were proportioned about the same,—the greatest per cent, both of males and females, having occurred in children under five years of age for the year 1902 and for the nine years, 1893-1901.

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disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

†*Definition of outbreak.*—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty-day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area. Also, comparisons of *years* require that outbreaks be counted as closed, at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains any apparent discrepancy between the numbers of outbreaks, cases and deaths here given and the number given at the beginning of this article.

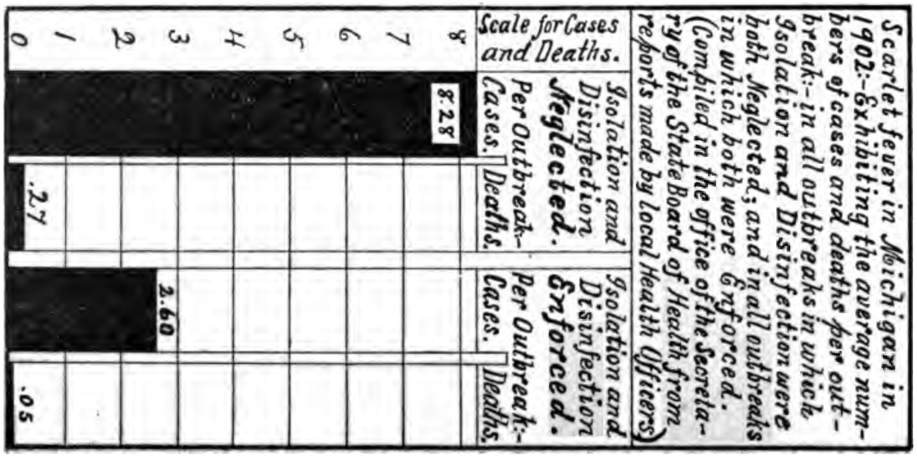
TABLE 8.—SCARLET FEVER IN MICHIGAN IN 1902. *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 930 outbreaks reported; (2) in the 255 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 25 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 83 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 84 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 52 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 170 outbreaks in which isolation and disinfection were both neglected; (8) in the 261 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (930 outbreaks.)*		(2) Isolation or disinfection or both not mentioned or statement doubtful. (255 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (25 outbreaks.)		(4) Isolation enforced—disinfection doubtful. (83 outbreaks.)		(5) Disinfection enforced—isolation neglected. (84 outbreaks.)		(6) Isolation enforced—disinfection neglected. (52 outbreaks.)		(7) Isolation and disinfection both neglected. (170 outbreaks.)		(8) Isolation and disinfection both enforced. (261 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	†4,204	148	†1,126	54	†95	8	†284	6	†442	16	†170	6	†1,408	46	†679	12
Averages	4.52	.16	4.42	.21	3.80	.32	3.42	.72	5.26	.19	3.27	.12	‡8.28	‡.27	‡2.60	‡.05

* These do not include the cases and deaths in the cities of Detroit, Grand Rapids, West Bay City, Kalamazoo, Saginaw, Ironwood, Traverse City, Jackson, Ishpeming, Marquette, Negaunee, Menominee, Ypsilanti, Battle Creek, Flint, Pontiac, and Calumet township, because of the difficulty in determining the beginning and ending of an outbreak in these cities or township, in which the disease was present in some part of the city or township nearly all the time.

† Includes deaths. ‡ These figures are graphically represented in the diagram on this page, entitled "Isolation and disinfection restrict scarlet fever."

ISOLATION AND DISINFECTION RESTRICT SCARLET FEVER.



This diagram graphically represents the lower line of figures in the last four columns of table 8.

[PLATE 1216.]

TABLE 9.—SCARLET FEVER. *Exhibiting for the 16 years, and for each of the 16 years 1887-1902, the numbers of reported outbreaks, cases and deaths; also for this 16-year period, the average numbers of cases and deaths per outbreak in all outbreaks; in those outbreaks in which isolation or disinfection or both were doubtful; isolation and disinfection both neglected; isolation and disinfection both enforced; and, also, the numbers of cases and deaths indicated as having been prevented by isolation and disinfection.*

Years.	*All outbreaks.			Isolation or disinfection, or both, not mentioned, or statements doubtful.			Isolation and disinfection both neglected.			Isolation and disinfection both enforced.			Cases and deaths indicated as having been prevented by isolation and disinfection.	
	Out-breaks.	Cases.†	Deaths.	Out-breaks.	Cases.†	Deaths.	Out-breaks.	Cases.†	Deaths.	Out-breaks.	Cases.†	Deaths.	Cases.†	Deaths.
1887	299	1,882	141	190	1,200	93	32	440	34	64	148	11	‡ 2,220	‡ 177
1888	340	1,838	112	225	955	74	61	724	33	36	80	3	‡ 2,198	‡ 72
1889	417	2,822	123	284	1,453	61	72	1,208	48	52	140	10	‡ 4,175	‡ 156
1890	477	3,054	115	302	1,711	67	94	1,137	36	42	76	1	‡ 2,718	‡ 66
1891	602	4,936	193	380	3,012	91	141	1,704	66	42	107	1	‡ 2,342	‡ 90
1892	622	5,240	306	377	2,944	188	110	1,621	59	42	97	7	‡ 3,928	‡ 30
1893	667	5,219	327	387	3,197	204	124	1,511	99	60	157	8	‡ 2,912	‡ 207
1894	662	4,349	175	378	2,366	93	104	1,348	42	74	187	9	‡ 4,231	‡ 90
1895	555	2,905	85	275	1,259	42	82	1,138	27	92	162	4	‡ 4,798	‡ 98
1896	389	1,534	42	148	485	15	80	681	16	78	153	4	‡ 1,776	‡ 36
1897	336	1,531	52	130	654	21	63	427	17	59	127	5	‡ 747	‡ 39
1898	397	1,759	74	140	645	24	52	441	23	88	202	6	‡ 1,608	‡ 101
1899	611	3,531	148	202	1,315	52	108	1,251	63	133	325	7	‡ 3,544	‡ 206
1900	783	4,389	218	306	1,762	93	138	1,439	63	165	417	26	‡ 3,778	‡ 142
1901	917	4,771	177	327	1,706	51	162	1,546	71	228	565	21	‡ 3,977	‡ 226
1902	930	4,204	148	255	1,126	54	170	1,408	46	261	679	12	‡ 3,496	† 103
Totals	9,004	53,964	2,436	4,306	25,790	1,223	1,593	18,024	743	1,516	3,622	135	§48,448 §47,871	§ 1,839 § 1,796
Averages, 16 years	563	3,373	152	269	1,612	76	100	1,127	46	95	226	8	3,028	115
Average cases and deaths per outbreak for sixteen years, 1887-1902	....	5.99	.27	....	5.99	.28	....	11.31	.47	....	2.39	.09	....	....

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* Outbreaks in Detroit, Grand Rapids and a few other localities, where the disease was present throughout the whole year, are not included, owing to the difficulty in determining the beginning and ending of an outbreak in those localities. The localities which are thus excluded in 1902 are given in a foot-note to Table 8 of this article; and for previous years, in foot-notes to similar tables in articles on scarlet fever for those years.

† Includes deaths.

‡ The numbers of cases and deaths in this double column are found by multiplying "all outbreaks" for each year by the average numbers of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were reported to have occurred that year. § The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows:—(1) The 48,448 cases and 1,839 deaths are totals of the columns representing cases and deaths saved as explained in the ‡ foot-note. (2) the 47,871 cases and 1,796 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the sixteen years, 1887-1902 (11.31 and .47 where isolation and disinfection were neglected) by the total number of outbreaks, to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the sixteen-year period.

TABLE 10.—*Exhibiting for the ten years, 1892-1901, and for the year 1902, the reported period of incubation, in days, in cases of scarlet fever in Michigan. Compiled from reports of health officers in Michigan.*

Incubation period—days...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Instances in each day, for ten years, 1892-1901*......	16	57	73	102	103	88	224	107	93	168	27	42	14	150	16	11	7
Instances in each day, for the year, 1902*............	2	9	12	13	17	10	54	16	15	28	3	10	2	21	4	3	1
Incubation period—days...	18	20	21	22	23	24	25	26	28	29	30	33	35	36	42	56	....
Instances in each day, for ten years, 1892-1901*......	8	6	45	1	0	2	2	3	5	2	3	2	2	0	4	1	....
Instances in each day, for the years, 1892 1902*......	3	3	8	0	1	0	0	1	1	0	1	0	0	1	0	0	....

*In many of these instances it was reported as *about* the number of days stated.

TABLE 11.—*Exhibiting in certain age-groups, the numbers of cases and deaths from scarlet fever; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1902, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																		
Ages in groups of years.......	All ages known.	0-1.	1-2.	2-3.	3-4.	4-5.	0-5.	5-9.	10-14.	15 19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-54.	55-59.	Over 60.
No. of cases*...	4,418	67	147	220	298	345	1,077	1,811	965	286	125	58	45	25	15	5	3	0	3
Per cent the cases in each group were of all cases.......	100	1.5	3.3	5.0	6.7	7.8	24.4	41.0	21.8	6.5	2.8	1.3	1.0	.6	.3	.1	.1	0	.1
No. of deaths†.	243	19	34	40	27	19	139	77	13	2	7	1	4	0	0	0	0	0	0
Per cent the deaths in each group were of cases in that group..........	5.5	28.4	23.1	18.2	9.1	5.5	12.9	4.3	1.3	.7	5.6	1.7	9.0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths.....	100	7.8	14.0	16.5	11.1	7.8	57.2	31.7	5.3	.8	2.9	.4	1.6	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths..........	......	57.2					88.1		5.3	5.8				0					

*Does not include cases where the age was not stated.
†Does not include deaths where the age was not stated.

Average age of fatal and non-fatal cases of reported scarlet fever.—The average age of decedents for the year 1902 was 4.8 years for males and 5.3 years for females; for the period of years, 1893-1901, the average age of decedents was 5.3 years for males and 6.0 years for females. The average age of cases recovering from this disease for the year 1902 was 8.6 years for males and 9.4 years for females; for the period of years, 1893-1901, the average age was 8.0 years for males and 8.9 years for females.

TABLE 12.—*Exhibiting in certain age-groups, the numbers of cases and deaths from scarlet fever in the year 1902, and in the ten years, 1892-1901; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths. Compiled from all reports for the years 1892-1902, which stated the ages.*

Year.		Total No. included.*	Per cent of cases and deaths in certain age-groups.										
			All ages.	0 to 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 years and over.
1902.	Cases................	4,418	100	24.4	41.0	21.8	6.5	2.8	1.3	1.0	.6	.3	.6
	Deaths..............	243	100	57.2	31.7	5.3	.8	2.9	.4	1.6	0	0	0
1892-1901.	Cases................	29,446	100	29.2	41.4	18.4	5.8	2.1	1.3	.8	.5	.2	.2
	Deaths..............	1,362	100	56.3	29.3	8.2	2.9	1.5	.3	.7	.4	.2	.1

*In this table *cases* include both *fatal* and *non-fatal* cases.

TABLE 13.—*Exhibiting, by sex, and in certain age-groups, the per cent of persons who died from scarlet fever in Michigan, during the year 1902, and the nine years, 1893-1901; also the average age at death, and the number of deaths included. Compiled from such reports as stated the ages.*

Deaths from scarlet fever.															
Year.	Sex.	Average age, years.	No. of deaths included.	Ages.—In period of years. Per cent of deaths in each period of age.											
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males............	4.8	119	100	55.5	36.1	5.0	.8	0	0	2.5	0	0	0	0
	Females........	5.3	124	100	58.9	27.4	5.6	.8	5.6	.8	.8	0	0	0	0
1893-1901.	Males............	5.3	604	100	57.4	30.5	5.8	3.6	1.0	.5	.7	.3	0	0	.2
	Females........	6.0	630	100	51.4	31.1	10.3	3.2	2.1	.3	.6	.6	.3	0	0

Duration and average duration of sickness from reported scarlet fever.—the duration of sickness of fatal cases in 1902 was given in ninety-four instances among males and in ninety-two instances among females. Of these, the greatest per cent died before the sixth day of sickness. The average duration of sickness in these fatal cases for the year 1902 was

10.7 days for males and 11.3 for females. For the nine years, 1893-1901, the average duration of fatal cases was 11.3 days for males and 11.2 days for females.

The average duration of non-fatal cases of scarlet fever for the year 1902 was 21.7 days for males and 21.4 days for females. For the nine years, 1893-1901, the average duration of sickness for non-fatal cases was 19.7 days for males and 20.9 days for females.

TABLE 14.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from scarlet fever, in Michigan, during the year 1902, and the nine years, 1893-1901; also the average age and the number of cases included. Compiled from such reports as stated the ages.*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period of age.											
				All ages.	Under 5 ye'rs.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1902.	Males.....	8.6	1,939	100	24.4	41.8	22.0	6.5	2.3	1.0	1.1	.5	.2	.1	.1
	Females..	9.4	2,236	100	20.8	41.3	23.5	7.0	3.3	1.7	.9	.7	.5	.1	.2
1893-1901.	Males.....	8.0	11,280	100	27.4	43.7	19.1	5.4	2.0	1.0	.6	.5	.2	.1	.04
	Females..	8.9	13,229	100	23.2	42.7	21.3	6.4	2.6	1.5	1.0	.7	.3	.1	.1

TABLE 15.—*Exhibiting, by sex of patient, by per cent of cases which died in specified periods of time, the duration (in days) of fatal cases of sickness from scarlet fever in Michigan, during the year 1902, and the nine years, 1893-1901. Compiled from those reports which stated the length of time the patient was sick.*

Fatal cases of scarlet fever.															
Year.	Sex.	No. of fatal cases included.	Average duration.	Duration of sickness:—Per cent of deaths in each period of days.											
				All periods.	0 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 days and over.
1902.	Males.....	94	10.7	100	34.0	31.9	11.7	6.4	8.5	3.2	1.0	1.1	1.1	1.1	0
	Females..	92	11.3	100	31.5	28.2	15.2	12.0	5.4	2.2	2.2	1.1	1.1	2.2	0
1893-1901.	Males.....	395	11.3	100	38.5	24.1	12.9	8.1	5.8	4.6	2.8	1.3	.5	1.0	1.5
	Females..	433	11.2	100	39.7	22.9	13.4	8.5	6.7	1.8	3.0	.5	1.4	.9	1.2

TABLE 16.—*Exhibiting, by sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of non-fatal cases of sickness from scarlet fever in Michigan, during the year 1902, and the nine years, 1893-1901. Compiled from those reports which stated the length of time the patient was sick.*

Non-fatal cases of scarlet fever.															
Year.	Sex.	No. of cases included.	Average duration.	Duration of sickness:—Per cent of non-fatal cases in each period of days.											
				All periods.	0 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	Over 50 days.
1902.	Males.....	1,657	21.7	100	2.4	9.8	17.1	19.1	20.2	14.3	7.9	4.2	2.2	1.3	1.5
	Females..	1,836	21.4	100	1.9	11.5	17.4	18.7	23.6	11.5	6.5	3.8	2.3	1.1	1.7
1893-1901.	Males.....	8,072	19.7	100	3.3	14.9	18.9	16.3	16.2	13.6	6.8	4.1	2.6	1.5	1.8
	Females..	9,308	20.9	100	2.8	14.8	19.4	16.2	17.1	13.3	7.1	4.1	2.6	1.3	1.5

RÖTHELN (GERMAN MEASLES) IN MICHIGAN IN 1902.

During the year ending December 31, 1902, there were reported to the office of the Secretary of the State Board of Health ten outbreaks of rötheln resulting in thirty-seven cases. In one outbreak the number of cases was not stated,—reported as a "very mild epidemic."

There were five final reports in reference to the restriction of this disease sent to this office. In these, in one outbreak only, were restrictive measures thoroughly enforced.

This Board has placed rötheln in the list of "diseases dangerous to the public health," and recommends that all cases be reported and action taken to prevent its spread, because when scarlet fever first makes its appearance, it is sometimes difficult to determine whether it is rötheln or scarlet fever, and if it is called rötheln and not reported, a dangerous disease may spread. Therefore, and because what is alleged to be rötheln sometimes causes deaths, this Board has voted that rötheln should be considered a "disease dangerous to the public health," and as such, it should be reported, and the same precautions taken to prevent its spread as are taken to prevent the spread of scarlet fever.

SMALLPOX (VARIOLA) IN MICHIGAN IN 1902.

During the year ending December 31, 1902, there were reported to the Secretary of the State Board of Health, 809 outbreaks of smallpox in 591 localities in Michigan, which resulted in 7,086 cases, including forty deaths.

Definition of the term outbreak.—An outbreak is considered as the existence of one case, or of many cases of smallpox at the same time or consecutively, within one health officer's jurisdiction, whether city, village or township. All cases of the given disease occurring within that jurisdiction and with only short intervals between them, are considered as part of the outbreak, unless the contagium can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate and distinct outbreak.

Whenever a break of sixty days or more has occurred in the progress of a communicable disease in a given township, village or city it has been regarded as two different outbreaks, but if the second appearance of the disease could be traced from the first the intermission was disregarded and it was treated as a single outbreak. Comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to consider *complete outbreaks*, even where they extend from one year into the next. This explains the discrepancies between the numbers of outbreaks, cases, and deaths, here given and the numbers given further on in this article in connection with Table 7.

Smallpox epidemic.—The mild but widespread epidemic of smallpox which has been prevalent in Michigan during the years 1901-2, is a part of the general widespread epidemic now prevalent in many sections of the United States. A marked characteristic of the disease existing in Michigan as in other States during these years, has been its extreme mildness. This particular feature of the disease has been so marked, that in many instances delay in combating it has resulted, very greatly increasing the difficulty of restricting the spread of the disease. An evidence of the mildness of the disease is shown by the very low fatality in the State. In the year 1902 only forty deaths have been reported to have occurred out of a total of 7,086 cases of sickness, which gives the exceedingly low fatality of .56 of one death per 100 cases.

It is well known that smallpox can be prevented or modified by vaccination; and a widespread epidemic of the disease can be attributed only to an equally widespread ignorance or wilfulness concerning smallpox and its prevention by vaccination and revaccination.

To do away with the widespread ignorance which is still so apparent, whenever information that smallpox is present in any locality in Michigan is received by the Secretary of the State Board of Health, a letter is sent to the health officer of that locality, urging him and his local board of health to meet promptly and publicly recommend and urge general vaccination and revaccination, and to offer free vaccination to all who are not able to pay for the same. Pamphlets, "Vaccination and Revaccination,—The Prevention of Smallpox," also are sent to the health officer with the request that he distribute them to the neighbors of the families where the disease is present.

TABLE 1.—*Exhibiting the estimated population of Michigan in each of the years 1892-1902 inclusive, the numbers of outbreaks, cases, and deaths, from smallpox in each year, and the death-rate each year.**

Year.	Population.	Cases	Deaths.	Death-rate.*	Out-breaks.
1892	2,185,279	1	1	.004	1
1893	2,204,563	10	3	.01	2
1894	† 2,241,454	285	60	.27	41
1895	2,278,579	185	47	.21	23
1896	2,315,517	38	16	.07	8
1897	2,352,455	15	0	.00	2
1898	2,389,393	32	1	.004	7
1899	2,426,331	139	6	.02	24
1900	‡ 2,420,982	649	9	.04	100
1901	§ 2,450,872	5,088	31	.13	620
1902	§ 2,480,762	7,086	40	1.6	809

*Death-rates for the years 1892-1901 are computed per 10,000 inhabitants; for the year 1902, per 100,000 inhabitants.

†State Census.

‡U. S. Census.

§Population estimated by average annual increase (arithmetical method) based on State Census of 1894 and the U. S. Census of 1900. Computed in the office of the State Board of Health.

An important factor in the spread of this disease is the prevailing ignorance of the characteristic symptoms and physical signs of smallpox, this resulting in a general failure to recognize the disease until a large number of cases have occurred. Unfortunately this ignorance has not been confined to the common people, but has been quite common among practicing physicians. Inasmuch as the form of smallpox now present in this State is so mild that many cases occur for which no physician is called, the characteristics of the disease should be learned by the people generally, so that smallpox may be recognized as soon as it appears. Near the close of this article some of the characteristics of smallpox are mentioned.

Investigations of outbreaks of suspected smallpox.—During the year 1902, George E. Ranney, M. D., State Inspector of Dangerous Communicable Diseases, has been called upon to investigate outbreaks of suspected smallpox, where there was a dispute or doubt as to the diagnosis of the disease, or where the disease was not being restricted, at the following localities:

January 6 and 7, at Forest and Waverly townships, Cheboygan county; January 25, at Escanaba city; February 1, Vienna township, Genesee county; February 7 and 8, McBain village and Richland and Riverside townships, Missaukee county; February 10, Cassopolis village; February 26, Allis and Presque Isle townships, Presque Isle county; February 27, Richland township, Montcalm county; February 28, Ensley township, Newaygo county; March 10, Gilford and Wisner townships, Tuscola county; March 21, Belding city; March 22, Whitewater township, Grand Traverse county; March 24, Tuscarora township, Cheboygan county; March 25, Masonville township, Delta county; April 2, Sherman township, Iosco county; April 4, Mt. Clemens city; April 5, Adrian city; April 9, Sheridan village, Montcalm county; April 12 Ionia city; April 30, Sunfield township, Eaton county; May 26, Charlotte city; May —, Silver Creek township, Cass county; May 28, Addison village, Lenawee county; June —, Lincoln township, Arenac county; June 25, Aurelius township, Ingham county; June 26 and 27, Midland city; July 16, Sebewaing village, Huron county; August 7, Fenton village and Linden village, Genesee county; August 14, Roscommon village; November 20, Royal Oak township, Oakland county; November 26 and 27, Williams township, Bay county; November 29, Owosso city; December 11 and 12, Valley township, Allegan county; December 22, Flushing village, Genesee county; December 23, West Branch village, Ogemaw county.

Of the forty instances mentioned above, smallpox was found in each instance with the two exceptions of Cassopolis village, which proved to be chicken-pox, and Valley township, which proved to be scabies (itch).

In fourteen instances the conditions being such as are specified in Sections 4477-4483 of the Compiled Laws of 1897, the expense was paid by the State; in the twenty-six other instances the expense of the investigation was assumed by the locality asking for the investigation.

The reports of the State Inspector have enabled this office to avail itself of the details of the outbreaks visited, and has facilitated the work of combating the disease. This method, also, has proved an effective means of lessening the spread of the disease, by educating the people as to the necessity of prompt action, strict isolation of all infected persons and things, immediate and general vaccination, and after death or recovery of patients the thorough disinfection of all infected things.

Distribution of smallpox by counties during 1902.—The distribution by counties is shown in Table 2.

Smallpox in each month of the year 1902.—Sometimes the beginning of an outbreak is reported, but the exact time of the close of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. The last line of figures, in Table 3, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month.

The total of the first line of figures in Table 4 exceeds the total infected localities (591), for the reason that some of the localities remained infected in more than one month. This results in making the total of the second line of figures, which state the per cent, exceed one hundred per cent.

The second line of figures in Table 4 shows the per cent the localities infected in each month are of the total number of infected localities (591) reported to this office for the year 1902.

The third line shows the number of cases present in each month of the year; and the fourth line shows the per cent the cases present in each month were of all cases reported concerning which this information was stated. There were 713 cases of which the month or months in which they were present were not reported.

TABLE 2.—*Numbers of cases of deaths reported from smallpox per 100,000 persons living in each county in Michigan during the year 1902. Compiled from reports of health officers, etc.*

State and counties.	Estimated population of Michigan for 1902.*	Number of reported		Number per 100,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State......	2,480,762	7,086	40	285.6	1.6
Alcona........	5,781	30	0	518.8	0
Alger..........	7,358	9	0	122.3	0
Allegan	38,686	21	0	54.3	0
Alpena........	18,432	315	1	170.9	5.4
Antrim......	17,914	45	1	250.8	5.6
Arenac........	10,779	56	1	519.5	9.3
Baraga........	4,350	11	0	252.9	0
Barry..........	22,118	7	0	31.6	0
Bay............	62,734	383	1	610.5	1.6
Benzie	10,221	14	0	137.0	0
Berrien	50,339	22	0	43.7	0
Branch........	28,343	35	0	123.5	0
Calhoun......	49,927	44	0	88.1	0
Cass..........	20,776	61	0	293.6	0
Charlevoix...	14,718	77	0	523.2	0
Cheboygan...	16,144	185	2	1,145.9	12.4
Chippewa....	23,338	24	2	102.8	8.6
Clare..........	8,486	47	0	553.8	0
Clinton........	24,760	49	0	197.9	0
Crawford	3,019	16	0	529.9	0
Delta..........	25,417	178	3	700.3	11.8
Dickinson	18,932	45	0	237.7	0
Eaton	31,352	56	0	178.6	0
Emmet........	17,777	10	0	5.6	0
Genesee......	42,220	205	1	485.6	2.4
Gladwin......	7,116	52	0	730.7	0
Gogebic......	17,622	42	0	238.3	0
G'd Traverse	21,465	51	0	237.6	0
Gratiot.......	30,259	455	1	1,503.7	3.3
Hillsdale.....	29,729	5	0	16.8	0
Houghton....	73,353	85	2	115.9	2.7
Huron.........	34,796	91	0	261.5	0
Ingham.......	39,860	42	0	105.4	0
Ionia..........	34,165	263	1	769.8	3.0
Iosco..........	9,548	102	1	1,068.3	10.5
Iron...........	10,220	17	0	166.3	0
Isabella	23,230	198	0	852.3	0
Jackson......	48,782	16	0	32.8	0
Kalamazoo...	45,060	10	0	22.2	0
Kalkaska.....	7,629	22	0	288.4	0
Kent..........	132,302	299	1	226.0	.8
Keweenaw ..	3,353	3	0	89.5	0
Lake..........	4,643	9	0	193.8	0
Lapeer.......	27,229	46	0	168.9	0
Leelanau.....	10,882	2	0	18.4	0
Lenawee.....	48,360	10	0	20.7	0
Livingston....	19,406	18	0	92.8	0
Luce	3,193	6	0	187.9	0
Mackinac....	7,857	52	0	661.8	0
Macomb......	33,528	34	2	101.4	6.0
Manistee.....	28,434	24	0	84.4	0
Marquette....	42,313	21	0	49.6	0
Mason........	19,037	89	1	467.5	5.3
Mecosta......	20,681	207	1	1,000.9	4.8
Menominee ..	28,144	324	2	115.1	7.1
Midland	14,845	112	0	754.5	0
Missaukee....	10,088	144	1	142.7	9.9
Monroe.......	32,612	21	0	64.4	0
Montcalm....	32,286	280	1	867.2	3.1
Montmorency	3,498	36	0	1,029.2	0
Muskegon....	36,980	36	0	97.3	0
Newaygo	17,189	71	1	413.1	5.8
Oakland......	45,496	57	0	125.3	0
Oceana.......	16,658	32	0	192.1	0
Ogemaw......	8,473	47	0	554.7	0
Ontonagon...	5,971	4	0	67.0	0
Osceola	18,319	171	1	933.5	5.5
Oscoda.......	1,356	0	0	0	0
Otsego........	6,633	92	0	1,387.0	0
Ottawa.......	39,859	38	0	95.3	0
Presque Isle.	9,787	97	2	991.1	20.4
Roscommon .	1,829	1	0	54.7	0
Saginaw......	81,014	238	1	293.8	1.2
Sanilac.......	35,423	183	1	516.6	2.8
Schoolcraft..	8,141	14	0	172.0	0
Shiawassee..	34,202	48	0	140.3	0
St. Clair......	55,528	107	0	192.7	0
St. Joseph...	23,489	0	0	0	0
Tuscola	36,380	37	1	101.7	2.7
Van Buren...	34,008	38	0	111.7	0
Washtenaw..	49,177	2	0	4.7	0
Wayne.......	367,565	576	7	156.7	1.9
Wexford.....	17,775	64	0	360.1	0

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*Population estimated by average annual increase (arithmetical method) based on State Census of 1894 and the U. S. Census of 1900. Computed in the office of the State Board of Health.

TABLE 3.—*Exhibiting the reported number of outbreaks of smallpox which began, the number which ended, and the number of outbreaks which were present, in each month of the year 1902, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began	113	90	99	88	60	48	34	16	11	18	31	94	702
Number ended.....	25	76	101	113	103	68	66	31	28	8	15	31	665
Number present...	201	266	284	266	209	150	113	67	45	35	59	136	....

TABLE 4.—*Exhibiting the number and per cent of localities from which the presence of smallpox was reported, the number and per cent of cases of smallpox present in Michigan in each month and the number and per cent of cases of smallpox taken sick in each month, during the year 1902. Includes each case for which the time during which it existed was stated in the report. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.*

	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Infected localities, number	192	248	267	246	199	147	109	67	45	35	59	132	*591
Per cent............	32.5	42.0	45.2	41.6	33.7	24.9	18.4	11.3	7.6	5.9	10.0	22.3	....
Cases present, number............	1,032	1,242	1,338	1,193	1,013	666	484	250	143	200	546	992	†6,373
Per cent............	16.2	19.5	21.0	18.7	15.9	10.5	7.6	3.9	2.2	3.1	8.6	15.6	....
Cases taken sick, number............	881	846	916	825	646	431	298	122	79	161	449	665	‡6,319
Per cent	13.9	13.4	14.5	13.1	10.2	6.8	4.7	1.9	1.3	2.5	7.1	10.5	....

*Number of localities reported infected with smallpox in 1902.

†There were 7,086 cases of smallpox reported in 1902, in 6,373 of these cases the month or months in which they were present were reported, leaving 713 cases of which this information was not stated.

‡Of the 7,086 cases of smallpox reported in 1902, the months in which they were taken sick were reported in 6,319 instances.

TABLE 5.—*Exhibiting the number and per cent of deaths from smallpox in Michigan in each month of the year 1902.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number of deaths.	3	4	3	5	1	8	4	3	0	3	1	5	40
Per cent of deaths.	7.5	10.0	7.5	12.5	2.5	20.0	10.0	7.5	0	7.5	2.5	12.5	....

The fifth line of the table shows the number of cases taken sick each month; and the last line shows the per cent the cases taken sick each month were of the total number of these cases. There were 767 cases of which the months in which they were taken sick were not reported.

TABLE 6.—*Reported source of contagium of cases of smallpox, 1902.*

Traced to a former case	1,017
Contagium reported as from outside jurisdictions	542
Contagium reported as probably from outside jurisdictions	36
Unknown, or reports not definite	5,294
Not stated	197
All cases	7,086

Of the 7,086 cases of smallpox reported, during the year 1902, as exhibited in Table 6, the local health officers reported the source of contagium as follows: Traced to a former case, 1,017; from outside jurisdictions, 542; probably from outside jurisdictions, 36; unknown, 5,294; not stated, 197; total, 7,086.

Outbreaks of smallpox reported traced to preceding outbreaks in Michigan.—According to reports of local health officers in Michigan, the contagium of smallpox was permitted to spread from 145 localities to other localities resulting in those secondary localities in 273 outbreaks, with 2,574 cases, including thirteen deaths. From sixty-one of the 273 secondary outbreaks, the contagium was further spread to third localities, resulting in ninety-seven outbreaks with 643 cases, including two deaths; it was spread from the third to fourth localities, resulting in seventeen outbreaks with eighty-two cases, including one death; and from thence it was spread to fifth localities resulting in four outbreaks including sixteen cases. Thus 391 outbreaks with 3,315 cases, including sixteen deaths, were traced directly and indirectly to preceding outbreaks in Michigan.

Outbreaks of smallpox reported traced to localities outside of Michigan.—Sixty-eight outbreaks, with an aggregate of 649 cases, including five deaths, were reported as having been traced to forty-three localities outside of Michigan. From some of these sixty-eight outbreaks the contagium was further spread, resulting in thirty-seven outbreaks with 207 cases; from some of these third localities the contagium spread to fourth localities, resulting in eight outbreaks with forty-six cases, including one death; from the fourth localities the contagium was spread to fifth localities resulting in two outbreaks with six cases. Thus 115 outbreaks with 908 cases, including six deaths, were traced directly and indirectly to outbreaks outside the State.

An interesting table exhibiting the movement of smallpox from the infected localities where the disease was not restricted, has to be omitted in the publication of this article, because of its great length.

A total of 506 outbreaks, with an aggregate of 4,223 cases, including twenty-two deaths, were traced to previous outbreaks of smallpox; and in twenty-two outbreaks, with an aggregate of 181 cases, the source of contagium was reported by local health officers to have been from somewhere outside of their jurisdiction, but the exact localities were not stated.

In thirty-six outbreaks, with an aggregate of 285 cases, including one death, other outbreaks in Michigan were reported as the *probable* source of the contagium; and localities outside of the State were reported as the *probable* source of contagium of four outbreaks, with ninety-two cases in Michigan.

Estimated numbers of outbreaks and cases of smallpox prevented and lives saved by isolation and disinfection.—Comparisons are made in Table 7, of the average numbers of cases, including deaths, in outbreaks of smallpox where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases, including deaths, in outbreaks where these measures were neglected.

In the compilation of the reports for Table 7 showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the columns headed, "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned; or statements doubtful."

Table 7 shows that of 737 outbreaks, in 109 of them isolation and disinfection were either not mentioned or the statements were so doubtful as to be impossible of classification; a majority of them were probably neglected; in 156 outbreaks disinfection was enforced and isolation was neglected or doubtful; in 79 outbreaks, isolation was enforced, but disinfection was neglected or doubtful; in 160 outbreaks isolation and disinfection were both neglected, and out of the 737 outbreaks reported, 233 were reported as enforced. The results of the different modes of action are shown in Table 7.

By this Table (7) it may be seen that during the year 1902 there were reported to the office of the State Board of Health, 737[*] outbreaks of smallpox, with 5,708 cases, including 32[*] deaths. Had no efforts at restriction been made, and had the average number of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 10,362 cases, including 44 deaths. Had the average number of cases and deaths in all outbreaks been the same as those in the columns headed "Isolation and disinfection both enforced." there would have occurred only 3,287 cases, including 15 deaths, instead of 5,708 cases, including thirty-two deaths,[*] showing 2,421 cases, including seventeen deaths, prevented by restrictive measures.

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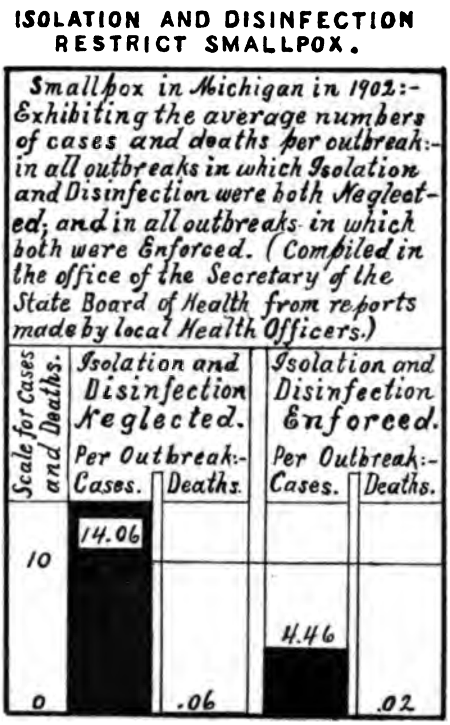
[*] Comparisons of *years* require that outbreaks be counted as closed at the end of the year, while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks*, even where they extend from one year into the next. This explains the discrepancies between the numbers of outbreaks, cases, and deaths, here given and the numbers given at the beginning of this article.

TABLE 7.—SMALLPOX IN MICHIGAN IN 1902: *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 737 outbreaks reported; (2) in the 109 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 156 outbreaks in which disinfection was enforced and isolation neglected or doubtful; (4) in the 79 outbreaks in which isolation was enforced and disinfection was neglected or doubtful; (5) in the 160 outbreaks in which isolation and disinfection were both neglected; (6) in the 233 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (737 outbreaks.)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (109 outbreaks.)		(3) Disinfection enforced—isolation neglected or doubtful. (156 outbreaks.)		(4) Isolation enforced—disinfection neglected or doubtful. (79 outbreaks.)		(5) Isolation and disinfection both neglected. (160 outbreaks.)		(6) Isolation and disinfection both enforced. (233 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals..........	5,708	32	817	7	1,222	9	381	2	2,250	9	1,038	
Averages..........	7.74	.04	7.50	.06	7.83	.06	4.82	.03	14.06	.06	4.46	.02



[PLATE 1217.]

The diagram [Plate 1217], on Isolation and Disinfection of Smallpox, exhibits graphically what has been accomplished in those outbreaks of smallpox in Michigan, in the year 1902, where isolation and disinfection have been enforced, compared with those outbreaks where isolation and disinfection have been neglected. An average of 14.06 cases with .06 of one death per outbreak has occurred in those outbreaks where isolation and disinfection have not been practiced, while an average of only 4.46 cases with .02 of one death per outbreak has resulted where isolation and disinfection have been enforced.

TABLE 8.—*Exhibiting for the four years, 1895, 1896, 1900 and 1901, and for the year 1902, the reported period of incubation in days, in cases of smallpox in Michigan. Compiled from reports of health officers in Michigan.*

Incubation period, days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Instances in each day, for 1895, 1896, 1900, 1901	....	1	4	1	1	1	15	4	17	34	5	40	15	144	19	10	5	20
Instances in each day, for the year 1902	1	2	4	5	2	3	17	9	30	34	7	43	21	178	15	23	5	2
Incubation period, days	19	20	21	22	23	24	25	26	27	28	29	30	34	60	....	....	....	....
Instances in each day, for 1895, 1896, 1900, 1901	2	6	18	2	5	....	1	....	....	1	2	1	1	1	....	....	....	....
Instances in each day, for the year 1902	8	9	12	2	....	1	....	2	1	2	....	1	....	......	....	....	....	....

Reported incubation period in smallpox.—By Table 8 it may be seen that for the years 1895, 1896, 1900 and 1901, the period of incubation in smallpox was reported in the greatest number of instances as fourteen days (144 instances), and the incubation period reported in the next greatest number of instances was twelve days, in forty instances; fourteen days were also reported in the most instances in 1902. For four years, 1895, 1896, 1900 and 1901, the period of incubation in days was reported in only 376 instances, and for the single year 1902 it was reported in 439 instances.

The average reported period of incubation for the four years, 1895, 1896, 1900 and 1901, was 13.9 days, and for the year 1902, it was 13.1 days.

Ages of fatal and non-fatal cases of reported smallpox in 1902.—Table 9 shows the proportion of sickness and deaths, and the fatality, from smallpox, by age-groups. Table 10 shows the proportion of non-fatal cases of sickness from smallpox, by age-groups.

Average age.—The ages of thirty-eight fatal cases of smallpox were reported for 1902. The average age of these being 26.4 years for males and 24.0 years for females. The average age of non-fatal cases was 22.4 years for males and 19.0 years for females.

Duration and average duration of sickness from reported smallpox.—Table 11 shows the duration of sickness of non-fatal cases of smallpox in 1902. The average duration of non-fatal cases was 21.2 for males and 20.5 for females. The duration of sickness of decedents was reported in but 25 instances. Of these the duration was 11.3 for males and 10.5 for females.

TABLE 9.—*Exhibiting in certain age-groups, the number of cases and the number of deaths from smallpox; the per cent that the cases in each group were of all cases of known ages, the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1902, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																		
Ages in groups of years.	All ages known.	Under 1.	1.	2.	3.	4.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-54.	55-59.	60 and over.
No. of cases*.....	3851	65	70	98	81	93	407	537	515	554	564	353	253	174	153	136	77	52	76
Per cent the cases in each group were of all cases of known ages...	....	1.7	1.8	2.5	2.1	2.4	10.6	13.9	13.4	14.4	14.6	9.2	6.6	4.5	4.0	3.5	2.0	1.4	2.0
No. of deaths*...	38	8	0	3	2	0	13	0	1	5	0	3	5	3	1	2	0	0	5
Per cent the deaths in each group were of cases in that group............	1.0	12.3	0	3.1	2.5	0	3.2	0	.2	.9	0	.8	2.0	1.7	.7	1.5	0	0	6.6
Per cent the deaths in each group were of all deaths, at known ages.............	....	21.1	0	7.9	5.3	0	34.2	0	2.6	13.2	0	7.9	13.2	7.9	2.6	5.3	0	0	13.2
Per cent the deaths in special groups were of all deaths, known ages..............	....	34.2					34.2		44.7						21.1				

*Does not include those cases or deaths where the age was not stated.

TABLE 10.—*Exhibiting by sex, the number of persons in certain age-groups, who recovered from smallpox, and the per cent of cases by age-groups who recovered from smallpox in Michigan, in 1902, also the average age and the number of cases included. Compiled from such reports as stated the ages.*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Number of (non-fatal) cases in each period of age.										
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 years and over.
1902.	Males............	22.4	2,168	......	182	270	239	301	383	230	141	113	97	212
	Females.........	19.0	1,645	......	212	267	275	248	181	120	107	58	55	122
	Per cent the non-fatal males in each age-group were of the total non-fatal males...			100	8.4	12.5	11.0	13.9	17.7	10.6	6.5	5.2	4.5	9.8
	Per cent the non-fatal females in each age-group were of the total non-fatal females.....................			100	12.9	16.2	16.7	15.1	11.0	7.3	6.5	3.5	3.3	7.4

TABLE 11.—*Exhibiting, by sex of patient, the duration (in days) of non-fatal cases of sickness from smallpox, in Michigan, during the year 1902. Per cent of cases arranged in five-day groups. Compiled from those reports which stated the length of time the patient was sick.*

			*Non-fatal cases of smallpox.														
			Duration of sickness:—Per cent of cases in each period of days.														
Year.	Sex.	No. of cases included.	All periods.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 to 60.	61 to 65.	66 and over.
1902.	Males	1,900	100	2.6	7.3	18.9	23.9	18.2	13.9	8.1	3.7	2.0	.7	.4	.2	.1	.2
	Females	1,438	100	2.4	8.1	22.4	24.0	16.5	12.6	7.6	3.1	2.1	.4	.5	.1	0	.2

*There were but twenty-five fatal cases concerning which the duration of the sickness was stated.

Relative to requiring the vaccination of children and adults.—March 25, 1902, H. E. Boice, M. D., health officer of Boyne City village, Charlevoix county, wrote to this office relative to vaccination, as follows:

"Is there any way to compel the people to get vaccinated? Situated near so many camps, we are in constant danger of having it brought in, but if we could only compel people to be vaccinated we would stop it.

"About seventy-five per cent of the school children are vaccinated, the other twenty-five per cent are kept at home rather than be vaccinated, and if the adults could be vaccinated, we would feel safe. But the larger per cent of adults prefer to take chances with smallpox rather than be vaccinated. Wherever there has occurred a case of smallpox, however, the exposed have been vaccinated. It is the class that have not been directly exposed and upon which I have no authority to vaccinate. Another thing, it is such a light form that people violate quarantine and when I report to the prosecuting attorney he refuses to prosecute because the offenders are in the saloon element, and that is the element that elects him. So there you are.

"Thus far we have had two or three violations and if the first had been punished we would not have had any more. What steps would you adopt to bring the prosecutor into line?"

March 27, 1902, the Secretary of the Board wrote to health officer H. E. Boice, M. D., as follows:

"Relative to requiring the vaccination of children and adults, permit me to call your attention to the hektograph No. 2550, 'Every person should be vaccinated.' A person cannot be compelled by the health officer to be vaccinated.

"Relative to the failure of the prosecuting attorney to prosecute for failures incurred within your jurisdiction, I will take up the subject with the Attorney General, if you desire me to. Before doing so, however, I would advise you to report in writing directly to the prosecuting attorney, all specific facts relative to every violation of the public health laws and disobedience of your orders when given under the law. At the time when you file such report with the prosecuting attorney, forward a copy to this office, and I will take up the subject upon the facts."

Smallpox in Sumner township, Gratiot county.—Relative to a case just recovering from smallpox, Mr. Seneca Sly wrote to the office of the State Board of health, as follows:

"A party having had the smallpox at Alma and claiming to have been let out of quarantine, but whose face is covered with scabs and scales, is running around our streets and visiting our public places. Is there danger of communicating the disease?"

February 2, 1902, the secretary of this Board wrote to Mr. Sly, as follows:

"If there is a party going around the streets of your village who has scabs and scales on his face there is great danger of the disease being spread, as that is the most dangerous period for the spreading of the disease, and the party should be isolated at once. You should report the facts to your health officer, who is required by law to order the isolation of all sick and infected persons. However, if all of your people will be vaccinated and revaccinated there will be no danger of their contracting smallpox."

TABLE 12.—*Exhibiting the localities, by counties, in Michigan, arranged alphabetically, at which smallpox was reported present during the year 1902, and the numbers of cases and deaths occurring in each locality.*

Counties.	Localities.	Cases.	Deaths.
Alcona	Caledonia Tp	5	0
	Gustin Tp	4	0
	Harrisville Tp	5	0
	Hayes Tp	4	0
	Mikado Tp	12	0
Alger	Au Train Tp	2	0
	Munising Vil	7	0
Allegan	Cheshire Tp	1	0
	Ganges Tp	3	0
	Martin Tp	1	0
	Salem Tp	16	0
Alpena	Alpena city	222	1
	Alpena Tp	31	0
	Green Tp	6	0
	Long Rapids Tp	8	0
	Maple Ridge Tp	10	0
	Wilson Tp	38	0
Antrim	Chestonia Tp	1	0
	Custer Tp	15	1
	Helena Tp	4	0
	Manchester Vil	17	0
	Manchester Tp	5	0
	Warner Tp	3	0
Arenac	Arenac Tp	2	1
	Au Gres Tp	3	0
	Clayton Tp	4	0
	Deep River Tp	1	0
	Lincoln Tp	25	0
	Mason Tp	1	0
	Standish Tp	16	0
	Turner Tp	3	0
	Whitney Tp	1	0
Baraga	L'Anse Tp	2	0
	Baraga Vil	2	0
	Spurr Tp	7	0
Barry	Maple Grove Tp	5	0
	Woodland Tp	2	0
Bay	Bangor Tp	2	0
	Bay City	38	0
	Beaver Tp	5	0
	Frankenlust Tp	1	0
	Fraser Tp	132	0
	Garfield Tp	12	0
	Gibson Tp	22	0
	Kawkawlin Tp	27	1
	Monitor Tp	13	0
	Mt. Forest Tp	4	0
	Pinconning Vil	8	0
	West Bay City	96	0
	Williams Tp	23	0
Benzie	Benzonia Vil	3	0
	Colfax Tp	3	0
	Homestead Tp	6	0
	South Frankfort Vil.	1	0
	Crystal Lake Vil	1	0
Berrien	Benton Tp	1	0
	Benton Harbor city	4	0
	Lake Tp	9	0
	Lincoln Tp	2	0
	Niles Tp	1	0
	St. Joseph city	5	0
Branch	Algansee Tp	1	0
	Bethel Tp	2	0
	Bronson Tp	6	0
	Butler Tp	1	0
	Gilead Tp	3	0
	Mattison Tp	7	0
	Quincy Tp	7	0
	Quincy Vil	2	0
	Union Tp	1	0
	Union city	5	0
Calhoun	Battle Creek city	18	0
	Convis Tp	14	0
	LeRoy Tp	1	0
	Marengo Tp	5	0
	Marshall city	6	0
Cass	Cassopolis Vil	2	0
	Dowagiac city	11	0
	Jefferson Tp	1	0
	LaGrange Tp	1	0
	Newberg Tp	5	0
	Penn Tp	9	0
	Silver Creek Tp	15	0
	Volinia Tp	17	0
Charlevoix	Boyne City Vil	16	0
	Boyne Falls Vil	28	0
	Boyne Vil	19	0
	Chandler Tp	6	0
	Charlevoix Vil	4	0
	East Jordan Vil	2	0
	Wilson Tp	2	0
Cheboygan	Benton Tp	34	1
	Burt Tp	31	1
	Cheboygan city	22	0
	Ellis Tp	23	0
	Forest Tp	9	0
	Grant Tp	5	0
	Mackinac Tp	1	0
	Mackinac City Vil	1	0
	Mentor Tp	4	0
	Nunda Tp	9	0
	Tuscarora Tp	27	0
	Waverly Tp	18	0
	Wilmot Tp	1	0
Chippewa	Bruce Tp	4	0
	Detour Vil	5	0
	Pickford Tp	1	0
	Sault Ste. Marie city	13	2
	Superior Tp	1	0
Clare	Arthur Tp	1	0
	Clare city	10	0
	Farwell Vil	4	0
	Frost Tp	2	0
	Greenwood Tp	8	0
	Harrison city	6	0
	Redding Tp	2	0
	Summerfield Tp	12	0
	Surrey Tp	2	0
Clinton	Dewitt Tp	2	0
	Duplain Tp	11	0
	Elsie Vil	14	0
	Lebanon Tp	1	0
	Maple Rapids Vil	3	0
	St. Johns Vil	7	0
	Victor Tp	5	0
	Westphalia Tp	6	0

TABLE 12.—Continued.

Counties.	Localities.	Cases.	Deaths.
Crawford	Grayling Tp	16	0
Delta	Escanaba city	116	3
	Escanaba Tp	13	0
	Ford River Tp	4	0
	Garden Vil	3	0
	Garden Tp	3	0
	Gladstone city	14	0
	Maple Ridge Tp	1	0
	Masonville Tp	21	0
	Nahama Tp	2	0
	Wells Tp	1	0
Dickinson	Breen Tp	22	0
	Felch Tp	10	0
	Iron Mountain city	4	0
	Norway city	8	0
	Sagola Tp	1	0
Eaton	Bellevue Tp	5	0
	Benton Tp	2	0
	Brookfield Tp	3	0
	Carmel Tp	7	0
	Charlotte city	2	0
	Grand Ledge city	2	0
	Potterville Vil	1	0
	Roxand Tp	1	0
	Sunfield Tp	6	0
	Sunfield Vil	3	0
	Walton Tp	24	0
Emmet	Bear Creek Tp	1	0
	Carp Lake Tp	3	0
	Harbor Springs Vil	2	0
	Littlefield Tp	1	0
	Petoskey city	3	0
Genesee	Argentine Tp	3	0
	Atlas Tp	3	0
	Burton Tp	1	0
	Clio Vil	8	1
	Fenton Tp	1	0
	Fenton Vil	13	0
	Flint city	22	0
	Flushing Vil	1	0
	Gaines Tp	8	0
	Grand Blanc Tp	7	0
	Linden Vil	39	0
	Montrose Tp	15	0
	Montrose Vil	5	0
	Mt. Morris Tp	2	0
	Munday Tp	15	0
	Otisville Vil	3	0
	Thetford Tp	4	0
	Vienna Tp	55	0
Gladwin	Beaverton Vil	27	0
	Beaverton Tp	2	0
	Billings Tp	15	0
	Gladwin city	2	0
	Tobacco Tp	6	0
Gogebic	Bessemer Tp	1	0
	Ironwood city	2	0
	Wakefield Vil	2	0
	Watersmeet Tp	37	0
G'd Traverse	Acme Tp	1	0
	East Bay Tp	5	0
	Peninsula Tp	1	0
	Traverse city	38	0
	Whitewater Tp	6	0
Gratiot	Alma Vil	173	1
	Arcada Tp	2	0
	Ashley Vil	2	0
	Bethany Tp	5	0
	Elba Tp	16	0
	Emerson Tp	8	0
	Ithaca Vil	6	0
	Lafayette Tp	5	0
	New Haven Tp	7	0
	North Shade Tp	8	0
	North Star Tp	4	0
	Pine River Tp	15	0
	Seville Tp	143	0
	Summer Tp	31	0
	St. Louis city	21	0
	Wheeler Tp	9	0
Hillsdale	Allen Tp	2	0
	Hillsdale city	1	0
	Pittsford Tp	2	0
Houghton	Adams Tp	2	0
	Calumet Tp	52	1
	Duncan Tp	2	0
	Franklin Tp	1	0
	Houghton Vil	1	0
	Laurium Vil	4	0
	Osceola Tp	18	0
	Quincy Tp	1	1
	Red Jacket Vil	1	0
	Schoolcraft Tp	3	0
Huron	Bad Axe Vil	2	0
	Bingham Tp	24	0
	Harbor Beach Vil	3	0
	Huron Tp	11	0
	Lincoln Tp	1	0
	Sand Beach Tp	18	0
	Sebewaing Tp	2	0
	Sebewaing Vil	8	0
	Sheridan Tp	5	0
	Sherman Tp	11	0
	Sigel Tp	1	0
	Verona Tp	5	0
Ingham	Alaiedon Tp	8	0
	Aurelius Tp	1	0
	Lansing city	18	0
	Locke Tp	3	0
	Meridan Tp	2	0
	Wheatfield Tp	9	0
	Williamston Tp	1	0
Ionia	Belding city	33	1
	Easton Tp	11	0
	Hubbardston Vil	1	0
	Ionia city	115	0
	Ionia Tp	14	0
	Keene Tp	22	0
	Lake Odessa Vil	6	0
	Lyons Tp	20	0
	North Plains Tp	2	0
	Odessa Tp	2	0
	Orleans Tp	1	0
	Otisco Tp	13	0
	Ronald Tp	11	0
	Saranac Vil	7	0
	Sebawa Tp	5	0
Iosco	Au Sable city	8	0
	Burleigh Tp	3	0
	East Tawas city	10	0
	Grant Tp	31	0
	Sherman Tp	47	1
	Tawas city	2	0
	Miller Tp	1	0

TABLE 12.—CONTINUED.

Counties.	Localities.	Cases.	Deaths.
Iron	Crystal Falls city	11	0
	Iron River Vil.	6	0
Isabella	Broomfield Tp.	7	0
	Chippewa Tp.	21	0
	Coe Tp.	34	0
	Deerfield Tp.	2	0
	Denver Tp.	1	0
	Fremont Tp.	27	0
	Isabella Tp.	14	0
	Lincoln Tp.	3	0
	Mt. Pleasant city	3	0
	Nottawa Tp.	18	0
	Rolland Tp.	2	0
	Shepherd Vil.	9	0
	Sherman Tp.	21	0
	Union Tp.	4	0
	Vernon Tp.	16	0
	Wise Tp.	16	0
Jackson	Columbia Tp.	1	0
	Jackson city	8	0
	Leoni Tp.	2	0
	Liberty Tp.	5	0
Kalamazoo	Climax Vil.	1	0
	Kalamazoo city	3	0
	Pavilion Tp.	2	0
	Schoolcraft Vil.	1	0
	Wakeshma Tp.	3	0
Kalkaska	Clearwater Tp.	2	0
	Excelsior Tp.	2	0
	Garfield Tp.	5	0
	Kalkaska Tp.	2	0
	Orange Tp.	2	0
	Rapid River Tp.	2	0
	Wilson Tp.	7	0
Kent	Ada Tp.	5	0
	Byron Tp.	10	0
	Caledonia Vil.	3	0
	Cannon Tp.	5	1
	Cedar Springs Tp.	1	0
	Courtland Tp.	3	0
	Gaines Tp.	1	0
	Grand Rapids city	115	0
	Grattan Tp.	8	0
	Nelson Tp.	15	0
	Oakfield Tp.	16	0
	Sand Lake Vil.	8	0
	Sparta Tp.	1	0
	Spencer Tp.	104	0
	Vergennes Tp.	3	0
	Walker Tp.	1	0
Keweenaw	Allouez Tp.	2	0
	Houghton Tp.	1	0
Lake	Chase Tp.	6	0
	Luther Vil.	3	0
Lapeer	Almont Vil.	1	0
	Arcada Tp.	1	0
	Deerfield Tp.	4	0
	Lapeer city	9	0
	Mayfield city	24	0
	Metamora Tp.	1	0
	North Branch	1	0
	Rich Tp.	5	0
Leelanau	Empire Tp.	2	0
Lenawee	Adrian city	3	0
	Addison Vil.	3	0
	Fairfield Tp.	1	0
	Hudson city	2	0
	Palmyra Tp.	1	0
Livingston	Brighton Vil.	2	0
	Iosco Tp.	1	0
	Marion Tp.	10	0
	Tyrone Tp.	5	0
Luce	Columbia Tp.	1	0
	McMillan Tp.	4	0
	Pentland Tp.	1	0
Mackinac	Brevort Tp.	4	0
	Newton Tp.	47	0
	St. Ignace city	1	0
Macomb	Armada Tp.	4	0
	Chesterfield Tp.	5	1
	Mt. Clemens city	22	1
	New Baltimore Vil.	2	0
	Warren Tp.	1	0
Manistee	Bear Lake Tp.	3	0
	Bear Lake Vil.	17	0
	Manistee Tp.	3	0
	Spring Lake Tp.	1	0
Marquette	Forsythe Tp.	3	0
	Ishpeming city	1	0
	Marquette city	7	0
	Michigamme Tp.	4	0
	Turin Tp.	6	0
Mason	Amber Tp.	16	0
	Custer Tp.	3	0
	Ludington city	69	1
	Riverton Tp.	1	0
Mecosta	Ætna Tp.	22	0
	Big Rapids city	21	0
	Colfax Tp.	12	0
	Deerfield Tp.	3	0
	Fork Tp.	7	0
	Green Tp.	11	0
	Hinton Tp.	16	0
	Millbrook Tp.	24	0
	Morley Tp.	3	0
	Wheatland Tp.	88	1
Menominee	Cedarville Tp.	21	0
	Holmes Tp.	27	0
	Ingallston Tp.	16	0
	Menominee city	47	2
	Meyer Tp.	3	0
	Nadeau Tp.	46	0
	Spaulding Tp.	164	0
Midland	Greendale Tp.	5	0
	Homer Tp.	4	0
	Hope Tp.	7	0
	Ingersoll Tp.	4	0
	Jaspar Tp.	21	0
	Lincoln Tp.	2	0
	Midland Tp.	24	0
	Midland city	43	0
	Mt. Hayley Tp.	1	0
	Warren Tp.	1	0
Missaukee	Ætna Tp.	11	0
	Bloomfield Tp.	12	0
	Caldwell Tp.	6	0
	Lake Tp.	6	0
	McBain Vil.	42	0
	Norwich Tp.	17	0
	Pioneer Tp.	9	1
	Richland Tp.	8	0
	Reeder Tp.	13	0
	Riverside Tp.	20	0

TABLE 12.—CONTINUED.

Counties	Localities	Cases	Deaths
Monroe	Dundee Tp	4	0
	Exeter Tp	[illegible]	0
	London Tp	1	0
Montcalm	Bloomer Tp	[illegible]	0
	Bushnell Tp	[illegible]	0
	Carson City Vil	[illegible]	0
	Crystal Tp	[illegible]	0
	Day Tp	[illegible]	0
	Douglas Tp	[illegible]	0
	Edmore Vil	3	0
	Eureka Tp	1	0
	Evergreen Tp	8	0
	Fairplains Tp	[illegible]	1
	Ferris Tp	3	0
	Greenville city	[illegible]	0
	Home Tp	5	0
	Howard city	[illegible]	0
	Lakeview Vil	2	0
	Maple Valley Tp	31	0
	Montcalm Vil	2	0
	Pierson Tp	15	0
	Pine Tp	1	0
	Reynolds Tp	1	0
	Richland Tp	45	0
	Sheridan Vil	35	0
	Sidney Tp	4	0
	Stanton city	38	0
	Winfield Tp	2	0
Montmorency	Albert Tp	10	0
	Briley Tp	8	0
	Hillmore Vil	2	0
	Hillmore Tp	6	0
	Rust Tp	1	0
	Vienna Tp	9	0
Muskegon	Casnovia Tp	4	0
	Cedar Creek Tp	9	0
	Fruitland Tp	1	0
	Laketon Tp	4	0
	Moorland Tp	7	0
	Muskegon city	*	
	N. Muskegon city	10	0
	Sullivan Tp		
Newaygo	Big Prairie Tp	33	0
	Bridgeton Tp		0
	Croton Tp		
	Ensley Tp	16	0
	Everett Tp	2	0
	Goodwell Tp	5	0
	Grant Tp	2	0
	White Cloud Vil		
Oakland	Brandon Tp	1	0
	Oxford Tp	3	0
	Pontiac city	7	0
	Rochester Vil	3	0
	Royal Oak Tp	43	0
Oceana	Elbridge Tp	30	0
	Grant Tp	2	0
Ogemaw	Churchill Tp	5	0
	Cummings Tp	1	0
	Edwards Tp	6	0
	Logan Tp	3	0
	Rose Tp	3	0
	West Branch Vil	29	0
Ontonagon	Greenland Tp	1	0
	Haight Tp	3	0
Osceola	Evart Vil	8	0
	Hartwick Tp	2	0
	Hersey Tp	9	0
	Highland Tp	20	0
	Lincoln Tp	3	0
	Marion Tp	7	0
	Marion Vil	7	0
	Middle Branch Vil	14	0
	Reed City	53	1
	Richmond Tp	48	0
Otsego	Bagley Tp	6	0
	Corwith Tp	7	0
	Dover Tp	44	0
	Elmira Tp	7	0
	Gaylord Vil	8	0
	Hayes Tp	1	0
	Livingston Tp	15	0
	Vanderbilt Vil	4	0
Ottawa	Allendale Tp	1	0
	Crockery Tp	1	0
	Grand Haven city	7	0
	Holland city	5	0
	Jamestown Tp	9	0
	Polkton Tp	1	0
	Spring Lake Tp	2	0
	Talmadge Tp	6	0
	Wright Tp	6	0
Presque Isle	Allis Tp	5	0
	Belknap Tp	3	0
	Case Tp	1	0
	Metz Tp	8	0
	Millersburg Vil	23	0
	Onaway Vil	22	1
	Posen Vil	22	1
	Presque Isle Tp	13	0
Roscommon	Roscommon Vil	1	0
Saginaw	Albee Tp	7	0
	Birch Run Tp	17	0
	Blumfield Tp	1	0
	Brady Tp	7	0
	Brant Tp	3	0
	Bridgeport Tp	1	0
	Buena Vista Tp	11	1
	Carrollton Tp	1	0
	Chapin Tp	34	0
	Chesaning Tp	9	0
	Jonesfield Tp	5	0
	Kochville Tp	3	0
	Lakefield Tp	12	0
	Richland Tp	14	0
	Saginaw city	86	0
	Taymouth Tp	5	0
	Thomastown Tp	1	0
	Tittabawassee Tp	21	0
Sanilac	Argyle Tp	1	0
	Austin Tp	9	0
	Bridgehampton Tp	1	0
	Croswell Vil	10	0
	Custer Tp	2	0
	Deckerville Tp	2	0
	Delaware Tp	6	0
	Elk Tp	1	0
	Flynn Tp	2	1
	Forester Tp	1	0
	Greenleaf Tp	5	0
	Lamotte Tp	10	0
	Lexington Tp	5	0
	Marion Tp	25	0
	Marlette Tp	39	0
	Marlette Vil	4	0
	Moore Tp	4	0
	Sanilac Tp	2	0
	Sanilac Center Vil	7	0
	Wheatland Tp	47	0

* Smallpox present, but no report from health officer.

TABLE 12.—CONCLUDED.

Counties.	Localities.	Cases.	Deaths.
Schoolcraft	Doyle Tp	8	0
	Manistique city	6	0
Shiawassee	Caledonia Tp	5	0
	Fairfield Tp	5	0
	Laingsburg Vil	1	0
	Middleburg Tp	5	0
	Owosso city	24	0
	Owosso Tp	1	0
	Rush Tp	6	0
	Woodhull Tp	1	0
St. Clair	Algonac Vil	1	0
	Berlin Tp	1	0
	Brockway Tp	1	0
	China Tp	1	0
	Clyde Tp	4	0
	Fort Gratiot Tp	1	0
	Kenockee Tp	2	0
	Kimball Tp	7	0
	Port Huron city	88	0
	St. Clair city	1	0
Tuscola	Almere Tp	1	0
	Caro Vil	1	0
	Cass City Vil	3	0
	Elkland Tp	2	0
	Gilford Tp	10	0
	Koylton Tp	7	0
	Vassar Vil	1	1
	Wells Tp	9	0
	Wisner Tp	3	0
Van Buren	Bloomingdale Tp	10	0
	Hartford Tp	2	0
	Hartford Vil	1	0
	Pine Grove Tp	18	0
	South Haven Vil	6	0
	South Haven Tp	1	0
Washtenaw	Ann Arbor city	1	0
	Superior Tp	1	0
Wayne	Delray Vil	6	0
	Detroit city	508	7
	Ecorse Tp	11	0
	Grosse Pointe Tp	17	0
	Hamtramck Vil	4	0
	Huron Tp	1	0
	Nankin Tp	2	0
	Springdale Tp	1	0
	Taylor Tp	20	0
	Wayne Vil	2	0
	Woodmere Vil	2	0
	Wyandotte city	2	0
Wexford	Boone Tp	5	0
	Cadillac city	22	0
	Cedar Creek Tp	11	0
	Hanover Tp	1	0
	Harring Tp	7	0
	Manton Vil	1	0
	Selma Tp	7	0
	Sherman Vil	2	0
	Slagle Tp	4	0
	Springville Tp	1	0
	Wexford Tp	3	0

What is the difference between smallpox and chicken-pox?—January 13, 1902, Mr. Nick Young, Muskegon city, Muskegon county, wrote to this office as follows:

"I would ask a favor, have you any literature on smallpox, such as will show the difference between chicken and smallpox? If so please send me some, for we have got smallpox here in Muskegon, but it is different from any I have ever heard of."

January 15, 1902, the secretary wrote to Mr. Young, as follows:

"This office has no literature bearing directly upon the subject of the difference between smallpox and chicken-pox. However, it must be remembered that adults seldom have chicken-pox, and when an adult is reported as having that disease it is always safest to assume it is smallpox, and take such precautionary measures as may be necessary for its restriction. No other disease has the same symptoms and physical signs that smallpox has, and whenever a person has headache, backache or fever, followed by an eruption or pimples, and the fever subsiding when the eruption appears, it is safe to call the disease smallpox. Relative to the disease being different from any smallpox that you ever heard of, in the Conference of Health Officers, held at Ann Arbor a short time since, Dr. Dock, of the University, who is a recognized authority upon the subject, stated that there were just such mild forms of smallpox before Jenner discovered vaccination. The first stages of the disease do not differ from the first stages of the more severe form, and about the only difference is in the last stage of the disease, the pustular stage. I send to you what literature this office has relative to the subject, and trust that it will prove useful to you.

"In chicken-pox the fever *begins* when the eruption *begins*. In chicken-pox the vesicles come in *successive crops*, which is not the case in smallpox. In chicken-pox the vesicles are covered by only the outer skin, and are easily broken down by rubbing with the hand; in smallpox they are covered by the entire skin and are *not* easily broken down."

In strong contrast to the usual conditions in chicken-pox, in which "the fever *begins* when the eruption *begins*," in smallpox, the primary fever ends when the eruption begins. In smallpox the eruption does *not* come in successive crops, therefore *not* all forms of it (papular, vesicular, pustular, and desquamative) are seen at one and the same time, as is commonly the case in chicken-pox. In smallpox the single crop proceeds consecutively through the several forms, one after the other.

Whenever an adult person has some fever, headache, and backache, for about three days, and these symptoms then cease, or nearly cease, at the same time that an eruption appears on the body, especially if on the face, neck and hands, that person should be considered as probably having smallpox. This is the more probable if the person was never successfully vaccinated, or not since several years previously. It is also more probable if the person was exposed to a similar case about twelve or fourteen days before being taken sick; because the period of incubation in smallpox is about twelve to fourteen days. It becomes still more probable if the eruption is at the very first papular (pimples), next vesicular (little watery blisters), next in some instances umbilicated (indented in the center), then some of them become pustular (containing pus, or "matter").

CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1902.

During the year ending December 31, 1902, there were reported to the office of the State Board of Health ninety-six outbreaks of chicken-pox in ninety-five localities in Michigan, which resulted in 700 cases (including five deaths) of chicken-pox. Relative to the isolation and disinfection of cases sick with chicken-pox, 420 cases, including one death, were reported as isolation and disinfection both neglected; and thirteen cases, including one death, isolation and disinfection both enforced. Of the remaining 267 cases, including three deaths, relative to 252 cases, including three deaths, isolation or disinfection or both were not mentioned or statements were doubtful; in three cases disinfection was enforced, isolation doubtful; in eight cases isolation was enforced, disinfection doubtful, and in four cases disinfection was enforced, isolation neglected.

ERYSIPELAS IN MICHIGAN IN 1902.

During the year 1902, reports relative to thirty-two cases (including two deaths) from erysipelas were received at this office from eighteen localities in Michigan. Five of the thirty-two cases were reported as facial erysipelas. The two deaths were reported as "black erysipelas."

February 15, 1902, D. J. Wallace, health officer of Sparta village, Kent county, wrote to this office as follows:

> "Should facial erysipelas be reported to the local health officer as a contagious disease dangerous to the public health, and if so what restrictions should be taken?"

February 17, 1902, the secretary of this Board wrote to health officer Dr. D. J. Wallace, as follows:

> "Replying to your letter of the 15th inst., erysipelas is a communicable disease dangerous to the public health, and as such should be reported to the health officer, the house placarded where the patient may be, and room disinfection occur following recovery."

PUERPERAL FEVER IN MICHIGAN IN 1902.

During the year 1902, only four non-fatal cases and one fatal case of puerperal fever were reported to the office of the State Board of Health. The above-mentioned cases must not be understood to include all the cases of puerperal fever which occurred in Michigan in 1902, for of the 5,979 postal-card reports received at this office during the year 1902, from observers in different parts of the State, about one per cent, stated the presence of puerperal fever in the localities from which the reports were sent.

TETANUS (LOCK JAW) IN MICHIGAN IN 1902.

During the year ending December 31, 1902, two cases of tetanus resulting in one death were reported to this office.

August 17, 1902, H. Beach Morse, health officer of Elk Rapids village and Elk Rapids township, Antrim county, reported to this office a case of tetanus in Acme township, Grand Traverse county, which he had treated, details of which are as follows:

"June 24, 1902, a woman twenty-six years of age, while screwing a top on a can of fruit, crushed the can and the glass cut a jagged wound in the wrist. The disease developed July 3. The signs and symptoms of the case were spasms of muscles of arms and legs, later of throat and jaw and back. Great soreness of muscles and swelling of arms. The swelling of arms and spasms and pain in opposite wrist began although the wound was nearly healed. Relapse July 12 and again July 23. The patient and nurse were kept by themselves in order to do away with all excitement and irritation possible. The wound was opened and cauterized. The patient recovered August 10.

"The period of incubation was nine days; the period of recurrence was nine days and the second period of recurrence was eleven days, indicating lessened virulence from the first relapse."

August 20, 1902, the secretary of this Board wrote to Theo. Schmalzriedt, M. D., health officer of Woodmere village, Wayne county, as follows:

"Please accept thanks for the report of a case of tetanus which you made on your postal card report, for the week ending August 16.

"Will you have the kindness to give me detailed report of all the facts and circumstances connected with this case?"

August 21, 1902, Dr. Schmalzriedt wrote to this office as follows:

"Walter Wittmann, aged 7 years, residing in Dearborn township, on August 10, 1902, stepped onto a rusty pitchfork, which was and for some time had been lying in a hog pen full of *decaying animal and vegetable matter*.

"I saw patient on August 12, and found suppuration, pain and slight fever. Encouraged suppuration by treatment and on August 14 and 15, suppuration, pain, tenderness and all ill-feeling had entirely ceased. Boy used foot as usual, running about in field. On August 16, at 2 p. m., I was called and found boy in convulsions recurring about every ten to twenty minutes. Temperature, pulse, respiration, reaction of pupils, all normal. In full possession of senses, but could not straighten head and neck, due to contraction of muscles of neck. Diagnosed tetanus. Under treatment, chloral and bromide, convulsions declined in severity and number. Removed him to Harper Hospital, Detroit, at 10 a. m., where at my suggestion, anti-tetanus serum was used. Rested some until 4 p. m., when convulsions increased in severity and frequency until 10 p. m., when death ensued."

MUMPS (PAROTITIS) IN MICHIGAN IN 1902.

During the year 1902, thirty-two outbreaks of mumps, resulting in two hundred and forty-three cases, including two deaths, were reported to this office. In three of the outbreaks, the numbers of cases were not reported.

The following extracts from correspondence give details of one of the outbreaks mentioned:

March 3, 1902, Dr. L. Z. Smith, health officer of Assyria township, Barry county, wrote to this office as follows:

> "I wish some advice regarding the way to handle mumps. As it is not considered a dangerous communicable disease it has been customary to pay but little attention to it.
>
> "I have a case here and am between two fires; parents wish to keep children in school who are coming from a home in which the case exists; on the other hand, some of the school patrons want them stopped.
>
> "Personally I would not wish to get the disease, not because I am afraid of it, but because it would greatly inconvenience me at present to have it. There may be others who do not care to get it even if it is not a very serious malady. They tell me here that in Bellevue, Eaton county, that pupils suffering from the disease went to school themselves and physicians went to the school to attend them."

March 4, 1902, the secretary of this Board wrote to health officer Dr. L. Z. Smith, as follows:

> "Your letter of March 1 has been received. Replying to that part of it relating to mumps, persons actually *sick* with mumps should not be permitted to attend school.
>
> "This office does not advise the strict isolation of persons so affected, for the laws relating to 'diseases dangerous to the public health' can not be made to apply to mumps; but I do advise the voluntary placarding of houses for that disease, isolation of the *sick* person within the house, and thorough disinfection after recovery."

Dr. H. H. Schaberg, health officer of Kalamazoo city, telephoned to Secretary Baker, January 28, 1902, that there were four cases of mumps among the adult employees of a factory in that city, and that the proprietors of that establishment had requested him to disinfect, which he would do that afternoon.

He also stated that he should also put a notice in the paper stating that he should consider mumps an infectious disease which he should expect doctors and householders to report to him.

BARBER'S ITCH IN MICHIGAN IN 1902.

August 18, 1902, a letter was received from Hastings city, Barry county, relative to a case of barber's itch, as follows:

> "Within the last thirty days I contracted a case of so-called 'barber's itch' in this city, and am informed that there have been a number of other recent cases (during the last three or four months), and this same thing appears to have been going on here for a number of years. I respectfully ask you if the law enables one to recover damage in these cases, and if so, if under civil or criminal proceedings?
>
> "While I am aware the law is not your profession you are surely posted on the conditions thereof in such case, and I think you should know of this matter for health reasons."

August 20, 1902, the secretary of this Board wrote as follows:

"Your letter of August 18, asking whether an action will lie against a person who exposes another to barber's itch has been received.

"Exposing a person to a communicable disease is an offense for which the person so doing may be proceeded against criminally, if the exposure is not merely of a private nature. If the act of exposing is of a private nature, it is not indictable, but may be viewed as an assault and battery.—Bishop's Criminal Law, Secs. 890-91, Vol. 1.

"Also a civil action for damages would lie against a person wilfully or negligently exposing another to a communicable disease. Barber's itch is a communicable disease."

RABIES (HYDROPHOBIA) IN MICHIGAN IN 1902.

During the year 1902, there were reported to this office thirty-two outbreaks of rabies, in animals, from thirty localities in Michigan, resulting in seventy-eight reported cases. In four of the outbreaks, the number of cases was not stated, so in all probability there were several more cases of rabies than seventy-eight.

Five persons were reported to have died from this disease during the year 1902. Lawrence Jankowski, Beaver township, Bay county; John Swartz, Niles city, Berrien county; Ruth Bouwman, Grand Rapids city, Kent county; Clarence Wirth, Saginaw city, Saginaw county; and George Metcalf, Detroit city, Wayne county.

The following are extracts of correspondence relative to four of the outbreaks mentioned.

July 8, 1902, the secretary of this Board wrote to W. H. Madison, health officer of Lincoln township, Alger county, as follows:

"Under the heading of 'Epidemic of Bovine Madness' in the Midland Sun of July 4, 1902, it is reported that cattle within your jurisdiction are affected with a disease resembling hydrophobia. Rabies is a disease dangerous to man as well as animals. It therefore becomes your duty as health officer, according to law, to take temporary control of the animals affected, and strictly isolate them—keep them away from every other animal—and report the facts to Hon. H. H. Hinds, president of the State Sanitary Live Stock Commission, Stanton, Michigan. Public Health Laws of 1899, Sec. 204, *et seq.*

"I trust you will control the conditions until you are relieved by the State Live Stock Sanitary Commission.

"Have the kindness to make final report of this alleged epidemic."

July 11, 1902, health officer W. H. Madison wrote to the secretary as follows:

"Your favor of the 8th inst. is before me, and would say, in regard to the Bovine Epidemic, there was only one cow affected with the disease. The cow was killed at once, and I have endeavored to have done all the law required me to do in the above case, and at this writing there is no other animal affected in my jurisdiction, to the best of my knowledge."

August 11, 1902, the secretary of this Board wrote to John Endline, health officer of Beaver township, Bay county, as follows:

"In an issue of the Lansing State Republican for July 8, notice is given of a farmer in Beaver township, Lawrence Jankowski, who was bitten by a dog exhibiting symptoms of rabies, and that last Monday Jankowski showed symptoms of the disease, and while being taken to Bay City for treatment died en route. It is also stated that Jankowski's wife and son also were bitten by the dog, and physicians fear that the woman may be attacked as was her husband.

"I should be very glad to have a report upon the subject by you. Were any other persons bitten? Is the newspaper account correct? Please give all details."

August 18, 1902, health officer John Endline sent a report of the case taken from a newspaper which verified the account in the Lansing Republican. He also wrote:

"The woman seems all right yet. I cannot add anything to this as Mr. Jankowski's brother says it is true, as I am only one-half mile from their house and know all about it."

October 7, 1902, the secretary of this Board wrote to Thomas M. Koon, M. D., health officer of Grand Rapids city, Kent county, as follows:

"In the Morning Enquirer, Battle Creek, October 4, 1902, under the heading, 'Grand Rapids,' Oct. 3. 'Little Ruth Died of Rabies,' it is reported that Ruth Bouwman, aged seven, was bitten by a dog, July 15, and later, Oct. 3, died of rabies. Will you have the kindness to make a final report of this case to this office? I shall be grateful for all details which can be obtained."

October 15, 1902, health officer Dr. T. M. Koon sent to the secretary a report of the case written by the attending physician, Dr. G. L. McBride, which is as follows:

"Ruth Bouwman, a healthy, rugged girl, eight years of age, was attacked July 15th, 1902, while sitting on the lawn in front of her home, with several of her playmates, by a vicious dog. The animal showed no disposition to attack any of the other children, and was driven off, with difficulty, by two men. I first saw the child about two hours afterwards, when I found about a dozen wounds, mostly superficial, on the left thigh and left upper arm. The wounds were thoroughly cauterized with concentrated carbolic acid and an antiseptic dressing applied. The dressings were changed from day to day, and the wounds healed entirely in about two weeks. Nothing more was heard of the case until the evening of September 29th, when the father of the child called at my office and reported that she had not been feeling well for two or three days, stating that she was feverish and complained of what he thought was rheumatism in the left leg.

"I saw the child the next day; her face had an anxious, frightened expression; she was very nervous and excitable, complained of severe pain in the left leg, and expressed a good deal of fear that she was 'going mad.'

"When the clinical thermometer was placed towards her mouth she burst out crying, and appeared to be badly frightened. After its use was explained to her she allowed it to be placed under her tongue and held it without difficulty.

"Her temperature at this time was 102, pulse 115, tongue coated and moist, bowels constipated. Her mother stated that the child had a constant dread of 'going mad,' that she was sick at her stomach at times and complained of pain 'all over.'

"I administered a large dose of cathartic, and left a liquid febrifuge to be given every two hours.

"Her father called at my office that evening and said the cathartic had not taken effect, that the child was quite restless and at times had a good deal of difficulty in breathing. I told him to give her a large dose of Rochelle Salts, and did not hear from her again until I called there the next morning. At that time her mother told me that she had passed a restless night and was somewhat delirious and could take her medicine only with the greatest difficulty. According to her mother's statement, every time the child attempted to take any liquid she would have a 'choking spell.' At that time her pupils were dilated, the eyes had a glassy expression, were moving constantly, the child was very excitable, and a part of the time delirious. I asked her to tell me her name, and with each attempt to do so a convulsive movement of the throat would take place. Every effort at speaking her own name caused a convulsive movement of the throat; but at the same time the child would speak whole sentences with little difficulty. I attempted to place a clinical thermometer in her mouth, but each time she attempted to open her mouth to receive it, distressing convulsions of the throat and mouth occurred.

"I asked her mother to bring me a glass of water and a teaspoon; as I did so convulsive movements of the throat of the child took place, and she with difficulty told me she could not take it. She made great efforts to take a little of the water, but I found that each attempt produced violent spasms of the muscles of deglutition. The cathartic had not operated although a large dose was given. At this time slight general convulsive movements could be noticed.

"I saw the child again in the afternoon of the same day, when the symptoms were much the same as in the morning only more pronounced. The pupils were enormously dilated; she was utterly unable to take liquids of any kind, the delirium had increased, and the general convulsive movement of the whole body become more pronounced, although they were not severe.

"A frothy mucus was being expelled from the mouth and seemed to collect in the throat and cause occasional spells of vomiting.

"I saw the child again about twelve o'clock that night, when she was entirely unconscious, in muttering delirium, pupils enormously dilated, eyes wide open and moving continually, and mild general convulsive movements occurring at varying intervals, much the same as in the afternoon. Mucus and froth were expelled frequently from the mouth, the jaws were moving most of the time as in act of masticating, and she occasionally vomited large quantities of a watery substance. I was unable to count the pulse at that time, and the temperature was not taken. She lay in the dorsal position continually with epigastrium thrown forward, required no restraint, and showed no tendency to attack any one near her.

"The child died about two o'clock the next morning (Oct. 2d). No movement of the bowels occurred from the time she was taken sick. She complained of pain in the left leg as long as consciousness lasted, but at no time complained of pain in the left arm. No record of the number of general convulsions was kept, and their mild nature might have been due to the fact that enemata of laudanum, chloral and bromide of soda were given at intervals of three hours during the last twenty-four hours.

"All efforts to locate the dog were unsuccessful and what became of it is a mystery.

"Another child, Mary Hommel, living at 522 N. Lafayette St., about two blocks from the Bouwman residence, was bitten; but there is no conclusive evidence to show that it was by the same dog.

"I saw the Hommel child today (Oct. 11th). She appeared to be in perfect health, but had two slight scars on her left ankle, and one on her nose, as evidence of her injury."

November 14, 1902, Dr. Ryan, Saginaw, Mich., called this office by telephone, stating that seven children had been bitten by a dog, which had escaped, and asked what to do. It is not positively known whether or not the dog was mad. The secretary informed him that the health officer ought to see that the public was protected from danger; that the dog would die if really mad; if the dog is caught it ought not to be killed if it can be kept alive with perfect safety; but if it is killed or dies he should immediately send a portion of the lower part of brain and upper part of spinal cord to the State Laboratory of Hygiene, Ann Arbor, with request that he be informed whether or not the dog was rabid; that he should get the germs out of the wounds if possible. The address of the Pasteur Institute at Chicago was given Dr. Ryan and he was advised to send bitten persons to an institute. Health officer ought to find out if it was rabies. He was warned to look out for *more* cases of rabies.

One of the children bitten by the dog, died of hydrophobia December 10, 1902.

December 12, 1902, the Detroit Journal published the following report of the case of rabies at Saginaw:

"The reason the University scientists did not sooner report in the case of the mad dog which bit several Saginaw children, causing the death of one, was that while the brain of the dog was supposed to have been shipped from Saginaw Nov. 13, it did not reach the State Laboratory of Hygiene until Nov. 19. The six days delay weakened the virus, and it took about four extra days for it to develop to its normal strength by the bacteria propagation process in the laboratory. The report was mailed on Tuesday. Prof. Novy pronounces the case as one of genuine hydrophobia."

RABIES AT HUDSON.

The Hillsdale Leader of March 21 contained the following:

"A mad dog caused considerable excitement at Hudson last Sunday. It ran about the streets snapping at other dogs, and once tried his teeth on a boy's trousers. It was finally killed."

The Secretary of the State Board of Health wrote Geo. W. Rice, M. D., Health Officer of Hudson, asking for a report. In his reply, Dr. Rice said that on March 9 a dog supposed to be mad ran through the streets of Hudson biting several dogs. The animal was killed, and Dr. W. H. Clement, Veterinary Surgeon of Hudson, sent a portion of the brain to the Agricultural College for examination. Prof. Charles E. Marshall, Bacteriologist at the College, wrote Dr. Clement that the dog's brain gave positive evidence of rabies.

Dr. Rice said that about ten dogs were killed, and the others taken proper care of, and that every precaution had been taken.

In every such instance of doubt, especially if a human being has been bitten, it is important that action be taken, as was done in this instance, to ascertain whether or not the animal has rabies. One method is to chain and keep the suspected animal in a secure manner, when if it has rabies its death will surely occur; but, even then, the examination of the brain or spinal cord by an expert is very desirable to make the diagnosis certain.

At the Sixth General Conference of Health Officials in Michigan, held in Ann Arbor, January 15 and 16, 1903, F. G. Novy, Professor of Bacteriology in the University, Ann Arbor, read a very interesting paper on "Hydrophobia,—Rabies, its Restriction and Prevention," which was afterwards published by the State Board of Health in the report of the Proceedings and Addresses of the Sixth General Conference of Health Officials in Michigan, and also published in the Teachers' Sanitary Bulletin No. 60, March 30, 1903. The paper contains illustrations of animals in the different stages of rabies, showing the characteristic positions assumed.

At the Conference of Health Officials, Dr. Thomas B. Cooley, Assistant Professor of Hygiene in charge of the Pasteur Institute, in the University of Michigan, gave the following suggestions regarding the treatment of persons bitten by animals supposed to be rabid:

"SUGGESTIONS REGARDING THE TREATMENT OF PERSONS BITTEN BY ANIMALS SUPPOSED TO BE RABID.

"In consideration of the fact that there has been for some months and is now a considerable epidemic of rabies among animals in various parts of Michigan and that a number of people have been bitten by animals possibly or certainly mad, it seems advisable to offer some suggestions concerning the treatment of such persons. The first and most important thing is the immediate treatment of the wound, and cauterization is generally known to be the proper procedure. There seems, however, to be some misapprehension, even among physicians, as to the period of time which may elapse before cauterization becomes useless and as to the proper method of cauterizing. A number of cases have come to my attention where the physician did not cauterize because a few hours had elapsed after the bite. There is, however, abundant proof that cauterization is often effective when done as late as twenty-four to thirty-six hours after the injury, and it is possible, at least, that good may be done by it even at a later time. I should say, therefore, that cauterization ought always to be performed if the wound is brought to the physician for treatment during the first three days.

"As to the caustics used: Probably the most common and least efficient is silver nitrate. Silver nitrate, or 'lunar caustic,' is at best only a feeble caustic, and has the further disadvantage of being solid, and, therefore, not reaching all parts of the wound. The caustic should be a liquid, and the most efficient one which is readily obtainable everywhere is pure or fuming nitrate acid, which should be applied with a glass rod to all parts of the wound, after it has first been thoroughly laid open and scrubbed—under anesthesia if the patient be a child or the wounds severe and painful. Ninety-five per cent carbolic acid is moderately efficient if nitric acid is not to be had. The actual cautery is inefficient because it does not so readily reach all parts of the wound. If this treatment be thoroughly carried out it may prevent some of the unfortunate cases where the incubation period is so short that the Pasteur treatment has no chance to be effective before the disease develops.

"With regard to sending patients to the Pasteur Institute for treatment: If there be any good reason for believing that an animal which has bitten a human being is mad it is unwise to wait until the animal dies of hydrophobia, or until the disease has been experimentally transmitted from this animal to others before sending the patient for treatment, as it is of the utmost importance that the treatment begin as early as possible. If the animal shows symptoms strongly suggestive of rabies it is best to send any persons who have been bitten to the Pasteur Institute and let the treatment begin at once. If the animal recovers or test animals do not develop the disease, the treatment can be stopped and will have done no harm."

Instruction have been issued from the office of the State Board of Health as follows:

Persons bitten by any animal suspected of being rabid should go at once to the Pasteur Institute, Hygienic Laboratory of the University of Michigan, at Ann Arbor, and the brain and spinal cord of the animal which has bitten the person should be sent there. These persons will be treated free of charge if residents of Michigan, but must provide their own room and board. Each person should bring a statement of bona fide residence, signed by the president or clerk of the township, or village board.

MUZZLE ALL DOGS AT LARGE.

The State Board of Health advises every local board of health in Michigan to immediately make and publish regulations ordering the muzzling of all dogs at large and the killing of all unmuzzled dogs found at large, and to make provision for the prompt and effective execution of such regulations.

Local boards of health have full power to make such regulations which, when published, have the force of law, the violation of which is a misdemeanor. This power or authority is implied, and is also given by statute in Michigan, in townships by Sections 4412 and 4413, Compiled Laws of Michigan, 1897; and these sections are made to apply in cities and villages by Sec. 4459, excepting in cases where the charters of such cities and villages contain provisions inconsistent therewith.

The section of law specifying the manner of the publication is as follows:

"Sec. 4416. Notice shall be given by the board of health of all regulations made by them, by publishing the same in some newspaper of the township, if there be one published therein, and if not, then by posting them up in five public places in such township; and such notice of said regulations shall be deemed legal notice to all persons."

The following form is recommended:

OFFICIAL PUBLIC NOTICE BY THE BOARD OF HEALTH. REGULATIONS FOR THE PREVENTION OF HYDROPHOBIA, BY THE RESTRICTION OF RABIES.

WHEREAS, rabies is widely disseminated and is epidemic in Michigan; and

WHEREAS, the State Board of Health has recommended that municipal and township authorities order the muzzling of all dogs at large, and make and publish regulations to that effect;

Resolved, That the local board of health of the township [city or village] of ...., county of ...., State of Michigan, hereby makes and publishes the following regulation:

All dogs, male or female, not effectually muzzled, running at large on any street, alley or public grounds, or private premises, not the premises of the owner or keeper thereof, may be killed by any person; and it shall be the duty of every constable [policeman, or other peace officer] of the said township [city, or village] and he is hereby ordered to kill any and all such dogs.

[Name of place, and date.] Attest.

....

Clerk of the Board of Health.

TUBERCULOSIS IN CATTLE IN MICHIGAN IN 1902.

Thus far no provision has been made by the legislature to ascertain the extent to which tuberculosis is destroying the domestic animals, and endangering human life in Michigan. The secretary of the State Board of Health believes that many of the deaths of children in Michigan are caused by bovine tuberculosis, contracted by infants attempted to be raised on cows' milk.

There is no statute law requiring cases of tuberculosis in cows which supply milk for human consumption to be reported to the State Board of Health, yet tuberculosis or suspected tuberculosis in cattle was reported to the secretary of the State Board of Health to be present in six localities in Michigan in 1902, namely,—Utica village, Macomb county; Soule, Chandler township, Huron county; Grand Ledge city, Eaton county; Monroe city, Monroe county; Mayville village, Tuscola county; and Monterey township, Allegan county.

The following extracts from correspondence give details relative to three of the above mentioned occurrences:

January 6, 1902, a letter was received at this office, relative to a case of tuberculosis in one cow, as follows:

> "A farmer five miles southeast of this village recently lost a cow that had been sick a long time, no one seeming to know what was wrong. The animal at last became so bad he had it killed and fed the meat to his poultry. When it was killed the stench was such that the man doing the work was almost overcome. There was fully a bushel of foreign matter much resembling fish eggs around the lungs and heart, which seemed to be the seat of the smell.
>
> "The brute had a terrible cough and many said it had tuberculosis. I am of the same opinion and therefore write you, as he has several cows and makes butter for sale. Several fat steers also, and all the animals now have the same cough. I heard him say he is fattening them as fast as he can in order to kill them before they are too bad.
>
> "I think it should not be allowed to go on, but no one has made complaint, fearing to make neighborhood trouble. He has had no medical aid, for he knows as well as the rest it is tuberculosis."

January 8, 1902, the secretary of this Board sent a copy of this letter to Hon. H. H. Hinds, President of the State Live Stock Commission, Stanton, Michigan, also writing:

"The writer of the above withholds his name, but in view of the very serious conditions described I trust that you will see that the subject is given prompt and thorough attention. I am writing to the health officer of Sterling township, Macomb county, in which the outbreak may be situated, urging him to take charge of the cases effectively until your Commission can take charge of the subject."

August 14, 1902, a postal card was received from James F. Wager, health officer of Chandler township, Huron county, which reads as follows:

"There is a diseased cow running at large here, I believe to be tubercular. I desire an investigation. Our veterinary concurs in my opinion."

August 16, 1902, the secretary of this Board wrote to health officer James F. Wager as follows:

"Replying to your postal of August 14, relative to a diseased cow running at large which you believe to have tuberculosis, I have today sent a copy of your communication to the president of the State Live Stock Sanitary Commission, Hon. H. H. Hinds, Stanton, Michigan, the subject being one under the authority of that Commission."

June 16, 1902, C. L. Jones, Veterinary Surgeon, Monroe city, Monroe county, wrote to this office as follows:

"I have a case of suspected tuberculosis. I was called Saturday, the 14th, to see the cow. She is in bad condition. I have her quarantined. I was called by the health board of Raisinville, the parties owning the cattle are willing to have them tested and want the State to foot the bill. Now there must be some action taken immediately. I will put them through the test if the State will stand the expense, or you can come and I will direct or take you there if you let me know so I can meet you at the train. Now this must have attention at once, so please attend to the matter without delay and send me some laws on contagious diseases."

June 17, 1902, the secretary of this Board wrote to C. L. Jones, V. S., as follows:

"We are in receipt of your letter of June 14, relative to tuberculosis among cattle. As this is a subject under the direction of the State Live Stock Sanitary Commission, I have respectfully referred your communication to Hon. H. H. Hinds, president of the Commission, at Stanton, Michigan. By this mail I send you a pamphlet of laws relating to live stock, and one of our pamphlets."

It would seem to be important that the legislature should take action to cause an inspection to be made which should reveal the extent to which domestic animals of the bovine species in Michigan are affected by tuberculosis.

At present a law requires reports of cases to be made to the State Live Stock Commission; but the law is not effective, for three reasons: (1) the Commission has no office at the capitol and its location is unknown to the people of the State; (2) the detection of tuberculosis by means of the tuberculin test requires an expert for its successful application, therefore as a rule the disease is not recognized with certainty; and (3) the State provides no compensation to the owner of an animal destroyed because tuberculous.

GLANDERS IN MICHIGAN IN 1902.

During the year ending December 31, 1902, there were reported to this office, eight outbreaks of glanders, in horses, from eight localities in Michigan. Only one case was reported from each of the following localities: Wexford township, Wexford county; Sherman village, Wexford county; Blanchard village, Rolland township, Isabella county; Prairie Ronde township, Schoolcraft county; Thompson township, Schoolcraft county; Penn township, Cass county; Shelby village, Oceana county; Rapid City village, Clearwater township; Kalkaska county.

The following extracts from correspondence give details relative to three of the above mentioned outbreaks.

January 28, 1902, D. W. Connine, health officer of Wexford township, Wexford county, wrote to this office as follows:

> "I have had a complaint. A man hauling logs with a horse with glanders. He has been told not to water his horse where the rest of the log haulers water their horses. He said he would not stop until obliged to. What can be done?"

January 30, 1902, the secretary wrote to health officer D. W. Connine as follows:

> "Replying to that portion of your letter relating to a case of glanders in a horse within your jurisdiction, I send you herewith a pamphlet on the work of health officers, etc., on page 6 and 7 of which (as I have marked) you will find information for guidance in the restriction of glanders,—a disease dangerous to man as well as to animals. I have also informed Hon. H. H. Hinds, president of the State Live Stock Sanitary Commission, Stanton, Michigan, of the outbreak, and you should fully report the circumstances to him, and *isolate the infected animal* or animals until the Commission can take charge of the outbreak.
>
> "Give your order to isolate in writing and keep a copy. Order isolation in accordance with Act 137, Laws of 1883 (page 3 or 4 of the pamphlet sent to you). If he disobeys, notify the officer for his prosecution, the supervisor."

July 22, 1902, W. E. Kinney, supervisor of Prairie Ronde township, Schoolcraft county, wrote to this office:

> "There is now owned in the township of Prairie Ronde a horse said to be suspected with glanders, and it looks very much like it to me. The parties refuse to kill the horse, claiming the V. S. says that it is not glanders, although others say it is. Now I am unable to learn what the duty of the Board of Health is in regard to the matter. Should we call the State Veterinary Surgeon to decide the matter or not? Will you kindly inform me as to the duty of the Board without delay?"

July 28, 1902, the secretary of this Board wrote to supervisor W. E. Kinney as follows:

> "You will see (from a marked paragraph in pamphlet sent) that it is the duty of your local board of health to temporarily isolate each case of glanders and keep it in isolation until the State Live Stock Sanitary Commission is informed of it and takes charge of the case. I also refer you to Sec. (204), Public Health Laws of 1899, which is Sec. 5632, Compiled Laws of 1897."

September 18, 1902, W. F. Kinney, health officer of Thompson township, Schoolcraft county, wrote to this office relative to a suspected case of glanders, as follows:

> "On the 29th of August a complaint was made to me that a horse belonging to Peter Quinlin of the township of Thompson was supposed to have the glanders. I immediately sent for a veterinary surgeon; he came on the 30th and made an examination. He said he could not call it a case of glanders, but it might develop into glanders, and that he considered it a very dangerous animal to be in a neighborhood, and that he would report the case to the State Veterinary Surgeon and would let me know as soon as he heard from the State Veterinary

Surgeon. Up to present date I have not heard from Mr. Sellers of Manistique. Please inform me what is best to do, as the people of this neighborhood feel alarmed about the matter. I would have written to you before, but I thought the V. S. knew better how to act in the matter than I did. Please inform me at once what is best to be done."

September 20, 1902, the secretary of this Board wrote to W. F. Kinney as follows:

"The duty of your local board of health is to immediately isolate the supposed infected animal and keep it in charge until the State Live Stock Commission is informed of the case and takes charge of it. Hon. H. H. Hinds, Stanton, Michigan, is president of the Commission, and you should inform him. Sec. 204, *et seq.*, Compiled Laws of Michigan, 1897.

"Please make a full report to this office of what is finally done in this case."

ALLEGED ANTHRAX IN MICHIGAN IN 1902.

An epidemic had broken out among cattle in Larkin township, Midland county, and the secretary of this Board on writing to the health officer, H. E. Town, received the following reply:

"Relative to the disease that was raging among the cattle of this township and others, would say that it was diagnosed by veterinary from Bay City to be Anthrax. Isolation was practiced and no more cases at present."

ACTINOMYCOSIS (LUMP JAW) IN MICHIGAN IN 1902.

During the year 1902, information relative to a case of lump jaw, in Onaway city, Presque Isle county, was received at this office from Charles Burgess of Onaway city, which read as follows:

"I write this to know if the lump jaw in cattle is catching. There is a yearling heifer owned by a man here and he allows her to run with cattle belonging to neighbors. The sore runs something awful; she also has a gurgling in her throat and a bad cough. Now if this disease is catching, all the cattle around here is being exposed. The man says he won't shut her up or dispose of her, so if it is catching what would you advise me to do?"

September 22, 1902, the secretary of this Board wrote to Charles Burgess as follows:

"You should make complaint to your local board of health, informing it of the facts in this case. It then becomes the duty of the board to take charge of the infected cattle and keep them isolated until the State Live Stock Commission, whose president is Hon. H. H. Hinds, Stanton, Michigan, is informed of the disease among the cattle and takes charge of them.

"Copy of your letter has been sent to President Hinds, and a letter has been written to your local health officer."

HOG CHOLERA IN MICHIGAN IN 1902.

During the year ending December 31, 1902, two outbreaks of hog cholera were reported to this office from Moscow township, Hillsdale county, and Litchfield township, Hillsdale county.

August 4, 1902, relative to a supposed outbreak of hog cholera in Litchfield township, Hillsdale county, the health officer, G. W. Buell, writes the following letter:

"Have a number of hogs that are sick and our veterinary, Mr. Newberry, says it is not cholera. There is about one hundred hogs sick here, in all stages. It is some contagious disease because I never had anything the matter before. I drove two sows to boar and they catched the disease and one of them has died since. This disease among the hogs is three miles south of Hanover. I have talked with my neighbors and they think we ought to call the State Veterinary. We should like to have him come as soon as possible before it spreads any more."

August 7, 1902, the secretary of this Board wrote to health officer G. W. Buell as follows:

"Replying to your letter of August 4, relative to disease of swine in your vicinity, as this is a subject under the consideration of the State Live Stock Sanitary Commission, I have respectfully referred a copy of your letter to Hon. H. H. Hinds, Stanton, Michigan, who is president of that Commission."

August 18, 1902, W. H. Atterbury, M. D., health officer of Litchfield township, Hillsdale county, wrote to this office as follows:

"A large number of hogs are dying off here with what is called hog cholera. Buyers are shipping them, if they are able to get onto scales to be weighed. What is to be done in this matter?"

August 19, 1902, the secretary of this Board wrote to Dr. Atterbury as follows:

"Your letter of August 18, 1902, stating that hogs in Litchfield township are dying from hog cholera, and that diseased animals are being sold for food, has been received.

"Your local board of health should investigate the subject and if reasonable probability exists that hog cholera is present among hogs, your board should strictly isolate each case and report the facts to the State Live Stock Sanitary Commission, whose president is Hon. H. H. Hinds, Stanton, Michigan, and hold the animals in isolation until the Commission takes charge of them.—Public Health Laws, 1899, Sec. 202, *et seq.*, C. L. 1897, Sec. 5630.

"Vendors of diseased meats should be prosecuted. They may be indicted under Public Health Laws, Sec. 135, *et seq.*, C. L. 1897, Sec. 11404.

"Copies of your letter have been sent to Hon. H. H. Hinds, and to the Dairy and Food Commissioner, Lansing, Michigan."

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF GASOLINE IN MICHIGAN IN 1902.

In 1902, as in former years, an effort was made, at the office of the Secretary of the State Board of Health, to collect facts respecting every casualty attributed to the use of gasoline, in Michigan, which came to notice. During the year there were received at the office of the Secretary of the Board reports of sixty-four casualties in twelve different parts of the State alleged to have been caused by gasoline, with attendant losses of life and property, and personal injury as follows: Four persons injured; damage to property in Detroit to the amount of $56,876.

TABLE 1.—*Casualties in Michigan during the year 1902, believed to have been consequent on the use of gasoline, information of which was received at the office of the Secretary of the State Board of Health.*

	Number of casualties.	Number of localities.	Pecuniary losses, dollars.	Lives lost.	Persons injured (not fatally).
In Detroit	49	1	$56,876	0	0
In State (outside Detroit)	15	11	0	0	4
Totals in Michigan	64	12	$56,876	0	4

The source of danger in the use of gasoline.—The special source of danger in the use of gasoline is its ready evaporation at low temperatures. When exposed to the air, gasoline evaporates quickly, its vapor mixes with the air, and therewith forms an explosive mixture which readily ignites when it comes in contact with a flame or other sufficient cause. This property of gasoline renders it more dangerous than is gunpowder. Some of the casualties reported were undoubtedly the result of ignorance, or disregard, of these facts.

Of the forty-nine reported casualties from the use of gasoline in Detroit during the year, thirty-one were attributed to leaking or overflowing stoves, and eighteen to carelessness in handling gasoline, and other causes.

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF KEROSENE, IN MICHIGAN, DURING THE YEAR ENDING DECEMBER 31, 1902.

Continuing a practice pursued in previous years, the office of the Secretary of the State Board of Health has, during the year 1902, sought to obtain information relative to each casualty, alleged to have been caused by the use of kerosene, which came to the notice of said office.

The principal sources from which this office obtains facts in regard to such casualties as above mentioned, are four, viz.: From reports by the fire marshal of Detroit, State inspectors and deputy inspectors of illuminating oils, local health officers, and from newspaper reports. Relative to the last of these sources of information it should be stated that the secretary of this Board does not accept as necessarily authentic, newspaper reports of casualties from the use of kerosene. When such reports come to his knowledge, he applies to the proper officials of the localities in which they are said to have occurred, for confirmation or contradiction of the reports, and for any information which these officials may be able to give in connection with the alleged casualties. A copy of the form of letter used on such occasions, is given in the annual report of this

Board for the year 1892, page 334. The data collected from these sources show that during the year 1902, information was received at this office of the occurrence of 53 casualties consequent on the use of kerosene in Michigan. The casualties were reported to have occurred in 31 localities, causing the loss of one life and two persons injured, and damage of property in Detroit to the amount of $14,661. No lives were lost nor were any persons injured in Detroit.

TABLE 1.—*Casualties in Michigan during the year 1902, believed to have been consequent on the use of kerosene, information of which was received at the office of the Secretary of the State Board of Health. In this year the legal test was a flash test of 120° Fahr., in a Foster automatic tester.**

	Number of casualties.	Number of localities.	Pecuniary losses, dollars.	Lives lost.	Persons injured (not fatally).
In Detroit	31	1	$14,661	0	0
In State (outside Detroit)	22	30	0	1	2
Total in Michigan	53	31	$14,661	1	2

*In 1893, the legal test of kerosene, for illuminating purposes, was, by legislative enactment (Section 2, Act 94, Public Acts of 1893), made as follows: "It shall be the duty of the inspector and his deputies to provide themselves at their own expense with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils hereinbefore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of 120 degrees of Fahrenheit's thermometer: *Provided,* The quantity of oil used in the flash test shall not be less than half pint. The oil tester adopted shall be the Foster automatic tester cup, with the lighted wick placed inside the tube, and under the thimble which shall be used by the inspector and his deputies." Act 94 became operative July 1, 1893.

This reported damage does not include all the actual pecuniary loss occasioned by the above mentioned casualties, because in some instances where houses, barns and other property were destroyed the loss was not reported.

ALLEGED NUISANCES IN MICHIGAN IN 1902.

During the year 1902, communications relative to ninety-two alleged nuisances in Michigan, were received at the office of the State Board of Health.

The causes to which the alleged nuisances mentioned in these communications were attributed, may be classified as follows:

Phosphate factory too near residence, 1; dynamite factory a menace to life and property, 1; refuse from sugar factory thrown in river, 3; refuse from gas plant discharging into river, 1; chlorine from chemical works destroying vegetation, 1; wash from creamery thrown on the ground, 2; open ditches or ditches stopped up, 6; improper drainage or sewerage, 14; ice contamination, 1; chicken coops, chicken yards, 3; barnyards, hog pens, rabbit pens, and stockyards too near residences, 5; hogs fed from dead animals, 2; insufficiently buried animals, 3; slaughterhouses or slaughtering, 6; unsanitary conditions of houses, schoolhouses, meat markets, livery stables, farms and yards, 18; overflow or pollution of water, 15; fertilizer stored too near residences, 1; water closets or privy vaults too near wells, 5; cider mill pomace, 1; hog pen 30 feet from creamery, 1; blind canal, 1; slaughter of fish by steam tugs, 1.

November 25, 1902, J. C. Deming of Charlevoix city, Charlevoix county, wrote to this office, relative to the slaughtering of fish by steam tugs in the port at Charlevoix, as follows:

> "As you are Secretary of Health Board I thought it proper and right for me to inform you of some facts that your attention has never been called to and that is the wholesale slaughter of fish by the steam tugs that is carried on in the waters of the northern lakes. In this little port of Charlevoix there has been as many as eleven steam tugs fishing at once ever since the opening of navigation and it will average up seven for the whole season, and a very low estimate of the fish caught would be more than fourteen hundred tons this season from this port alone; but here is the trouble, more than half of those fish are dead when lifted. The fishermen make a practice of leaving their nets in the water from three to five days before lifting and the fish drown and bloat and get so rotten that they won't hold together when taken out of the net. The rotten fish are salted and packed in barrels and some are smoked. These fish are put on the market and sold to people that do not know good fish from bad and sickness is the result. Now if drowned fish is allowed on the market why not allow drowned animals and fowls to go on the market in the same condition?
>
> "In 1893 the Health Board of Cleveland, Ohio, got after the fish dealers and fishermen and made them throw away many tons of just such fish, and they have had a better class of fish on the market since.
>
> "The Fish Commission are up in this country now gathering spawn and they go on board of the tugs and they are very careful not to have their nets out any longer than one night, so the Fish Commission will not catch on. but just as soon as the closed season is over they will drop back on their old way of leaving their nets out for a week or more. Why they do it is because they can handle so many more nets and get more fish.
>
> "Now you will excuse me for taking up your valued time to read this, but if you investigate you will find it just as I have told you."

November 28, 1902, the secretary of this Board wrote to J. C. Deming, as follows:

> "Your letter of November 23, relative to decomposed fish taken from the port at Charlevoix being sold for food, has been received. Please accept thanks. I have taken the subject up with the Dairy and Food Commissioner, Lansing, and the Fish and Game Warden, Portland, Michigan. Those are the two officials who have charge of this subject by law."

Whenever complaint of an alleged nuisance is received at this office, the president of the local board of health whose duty it is to act, is usually informed of the nature of the nuisance, and is requested to investigate the same. At the same time the sections of law, and pamphlet publications of this Board pertaining to nuisances and to the duties of local boards of health relative thereto, are sent to him and also to the person making complaint. Two regular forms of letters are used for this purpose. The first is sent to the person making complaint of the nuisance, the other is sent to the president of the board of health of the locality where the nuisance is reported to exist.

In articles on alleged nuisances, published in previous annual reports of this Board, attention was called to the fact that a large proportion of the communications received at this office in regard to alleged nuisances came from local health officers and other township, city and village officials asking for information relative to points of law concerning nuisances, or requesting advice as to their duties, or to the proper legal procedure necessary to effect the prevention or abatement of nuisances. The correspondence of 1902, shows a continued desire on the part of the local health officials for advice and coöperation of this Board, which has been freely and cheerfully given, and it is believed with results beneficial to the public health.

The State Board of Health has no authority to enforce or order the abatement of a nuisance. Its powers in this respect are advisory. And while the board is willing to render such advice as it may be able to give on any subject, it is often the case in regard to nuisances, that prosecuting attorneys or other lawyers on the ground and acquainted with the facts, are in better position to give legal advice than is the office of the State Board of Health. The Secretary of the State Board of Health is always glad to learn of the efforts of local boards to abate nuisances, and what success attends those efforts, and solicits correspondence upon this subject. However, the State Board of Health cannot undertake to do for local boards that which the law has so well provided for their doing for themselves. In showing them how they can help themselves it really does more for them than to do their work; for when the local board has mastered the situation and removed a nuisance, it has secured a vantage ground which a distant authority could not so well secure and hold.

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ERRATA.

On page 137, in Table 4, per cent of cases taken sick in April, should read **4.3 instead of 403.**
On page 157, in Table 21, the year 1982 should read 1902.

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